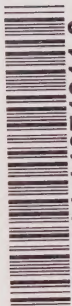


CAI  
Z1  
-75R011



**THE COMMISSION ON THE COSTS  
OF TRANSPORTING GRAIN BY RAIL**




3 1761 11971311 3

**TECHNICAL APPENDIX  
REPORT VOLUME I**

DEPOSITORY LIBRARY MATERIAL

**CAPITAL COSTS**



Digitized by the Internet Archive  
in 2023 with funding from  
University of Toronto

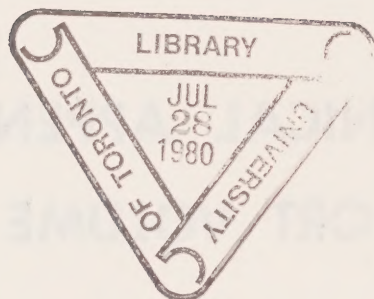
<https://archive.org/details/31761119713113>

CAI  
Z 1  
-75R011

**THE COMMISSION ON THE COSTS  
OF TRANSPORTING GRAIN BY RAIL**

**TECHNICAL APPENDIX  
REPORT VOLUME I**

**CAPITAL COSTS  
FEBRUARY 1979**



© Minister of Supply and Services Canada 1979

Available in Canada through

Authorized Bookstore Agents  
and other bookstores

or by mail from

Canadian Government Publishing Centre  
Supply and Services Canada  
Hull, Quebec, Canada K1A 0S9

Catalogue No CP32-24/1976-1-1  
ISBN 0-660-10212-9

Canada: \$6.00  
Other countries: \$7.20

Price subject to change without notice.



## TABLE OF CONTENTS

<u>Chapter</u>	<u>Page</u>
Preface	i
I. COMPONENTS OF CAPITAL COST	1
Depreciation Expense . . . . .	2
Capital Funds Cost . . . . .	4
II. LEGISLATIVE AND REGULATORY BACKGROUND	9
The Railway Act. . . . .	9
Canadian Transport Commission. . . . .	11
Application of Capital Cost in Canadian Regulatory Context . . . . .	15
III. ALTERNATIVE VALUATION BASES	25
Definitions. . . . .	26
The Valuation Issue. . . . .	27
Equivalence of Approaches. . . . .	30
Discussion of Alternatives . . . . .	47
Conclusion . . . . .	61
IV. RISK OF GRAIN TRANSPORTATION	63
Risk Categorization. . . . .	63
Systematic Risk. . . . .	65
Risk of CP Rail's Grain Transportation Service. . . . .	73
Conclusions. . . . .	96

## TABLE OF CONTENTS (Cont.)

<u>Chapter</u>	<u>Page</u>
V. CAPITAL STRUCTURE	99
The Basic Issues . . . . .	101
Capital Structures Submitted . . . . .	112
Capital Structure Selected . . . . .	119
Analysis of Potential Adjustments to the Selected Capital Structures. . . . .	121
Deferred Income Taxes. . . . .	122
Working Capital. . . . .	129
Offsetting Nature of Deferred Taxes and Working Capital Adjustments. . . . .	136
Pensions . . . . .	137
Donations and Grants . . . . .	144
Inert Assets . . . . .	146
Premium on Preferred Stock . . . . .	148
Capitalization of Leases . . . . .	153
Conclusion . . . . .	157
VI. LONG TERM DEBT FUNDS RATE	159
VII. PREFERRED EQUITY FUNDS RATE	167
VIII. COMMON EQUITY FUNDS RATE	171
Canadian Transport Commission Procedures . . . . .	173
Canadian Pacific Limited -- 1974 Financial Results. . . . .	175
Methodological Approaches. . . . .	180

## TABLE OF CONTENTS (Cont.)

<u>Chapter</u>	<u>Page</u>
VIII. COMMON EQUITY FUNDS RATE (Cont.)	
Methodological Approaches (Cont.)	
Discounted Cash Flow. . . . .	181
Earnings Price Ratio . . . . .	185
Capital Asset Pricing Model . . . . .	192
Comparative Procedures. . . . .	195
General Evaluation of Methodological Techniques. . . . .	196
Significance and Measurement of Growth of CP Limited. . . . .	199
Empirical Tests and Evaluations . . . . .	203
Discounted Cash Flow Approaches . . . . .	204
Ten Year Average Earnings . . . . .	206
Ten Year Weighted Average Earnings. . . . .	210
Dividends . . . . .	212
Retention Rate/Return . . . . .	214
Average Return - New Investment . . . . .	217
Earnings/Price Approximations . . . . .	221
Comparable Risk Companies - Unadjusted. . . . .	224
Comparable Risk Companies - Adjusted for M/B. . . . .	226
Comparable Risk Companies Within. . . . . 10% of M/B = 1 . . . . .	228



## TABLE OF CONTENTS (Cont.)

<u>Chapter</u>	<u>Page</u>
VIII. COMMON EQUITY FUNDS RATE (Cont.)	
Empirical Tests and Evaluations (Cont.)	
Earnings/Price Approximations (Cont.)	
Comparable Risk Companies Within 20% of M/B = 1 . . . . .	231
CP Limited 1973/74 Average E/P . . . .	232
CP Limited 1974 E/P. . . . .	234
CP Limited 1974 M/B in E/P Regressions. . . . .	235
CP Limited 1974 E/P (Earnings Smoothed). . . . .	236
CP Limited 1969-74 Average E/P . . . .	237
CP Limited Adjusted for Regulated Divisions, E/P . . . . .	237
Other CP Limited Relationships . . . . .	241
CP Limited Average Premium Over Long-Term Government Bonds . . . . .	241
CP Limited Premium Over CP Bonds . . .	242
Earnings Book Approximation. . . . .	243
Canadian Regulated Company Sample, 1974 . . . . .	249
Comparable Risk Companies, 1973-74. . . . .	251
Comparable Risk Companies With M/B = 1 Adjustment . . . . .	252

## TABLE OF CONTENTS (Cont.)

<u>Chapter</u>	<u>Page</u>
VIII. COMMON EQUITY FUNDS RATE (Cont.)	
Empirical Tests and Evaluations (Cont.)	
Other CP Limited Relationships (Cont.)	
CP Limited, 1974. . . . .	253
Other Regulatory Decisions. . . . .	255
U.S. FCC Allowance Applied to CP Bonds . . . . .	255
Canadian 1974 Allowed Rates . . . . .	257
Informed Judgment of Investment Dealer. .	263
Capital Asset Pricing Model . . . . .	265
Comparable Industry . . . . .	271
Solvent U.S. Railroads and U.S. Investor-Owned Electric Utilities . . .	271
Six Canadian Utilities, $M/B = 1.2162$ in E/P Regression . . . . .	273
Summary and Findings. . . . .	274
IX. CANADIAN NATIONAL'S CAPITAL FUNDS COST	277
CN Gross Investment Base. . . . .	277
CN Depreciation Rates . . . . .	278
CN Net Investment Base. . . . .	279
Canadian National's Capital Funds Cost. . .	280
Provincial Submission . . . . .	282
Canadian National Submission. . . . .	296



## TABLE OF CONTENTS (Cont.)

<u>Chapter</u>	<u>Page</u>
IX.	CANADIAN NATIONAL'S CAPITAL FUNDS COST (Cont.)
	Canadian National's Capital Funds Cost (Cont.)
	Commission Conclusions. . . . . 308
X.	COST OF CAPITAL FOR GOVERNMENT INVESTMENT 317
XI.	GROUP AVERAGE DEPRECIATION AND NET INVESTMENT 325
	Group Depreciation Methodology. . . . . 327
	Provincial Analysis . . . . . 332
	Grain Dependent Lines . . . . . 333
	Freight Cars. . . . . 334
	Commission Conclusions. . . . . 338

## TABLE OF CONTENTS (Cont.)

### Schedules

- I. COMMISSION ON THE COSTS OF TRANSPORTING GRAIN BY RAIL - LIST OF SPONSORS
- II. COMMISSION ON THE COSTS OF TRANSPORTING GRAIN BY RAIL - LIST OF SPOKESMEN
- III. COMMISSION ON THE COSTS OF TRANSPORTING GRAIN BY RAIL - LIST OF EXHIBITS
- IV. CP RAIL - CAPITAL FUNDS COST METHODOLOGY
- V. ASSET VALUATION METHODOLOGY AND INFLATION ON DEPRECIATION AND CAPITAL FUNDS COST
- VI. "EARNINGS BETA" FOR GREAT LAKES PAPER CO. LTD. BASED ON ALL OBSERVATIONS (1950-1974) AND WITH 1973 OBSERVATION EXCLUDED
- VII. COMPARABLE RISK COMPANIES - ALPHABETICAL LISTING BY QUINTILES AND BASIC CHARACTERISTICS OF COMPANIES
- VIII. TONNAGE BETAS - VARIOUS COMMODITIES
- IX. COMPARISON OF 1974 AFTER TAX CAPITAL FUNDS RATES ON COMMON SHAREHOLDERS' EQUITY ESTIMATED BY THE RAILWAYS, PROVINCES, AND THE COMMISSION
- X. CP LTD. DIVIDEND, EARNINGS, BOOK VALUE, RETENTION & GROWTH RATE, 1970-1974
- XI. ESTIMATED GROWTH RATE - E.P.S., CANADIAN PACIFIC LTD., BASED ON EXPONENTIAL SMOOTHING MODEL
- XII. FIRST AND SECOND QUINTILE COMPANIES IN INCREASING ORDER OF RISK
- XIII. BOOK VALUE AND MARKET VALUE CAPITAL STRUCTURES OF CANADIAN UTILITY, U.S. ELECTRIC POWER AND U.S. RAILROAD CORPORATIONS, AS OF DECEMBER 31, 1974
- XIV. GROUP DEPRECIATION SPECIMEN CALCULATIONS

## TABLE OF CONTENTS (Cont.)

<u>Tables</u>	<u>Page</u>
I. Comparison of Real and Nominal Net Returns to Book Values -- under Different Asset Valuation and Inflation Conditions	37
II. Capital Cost under Alternative Valuation Bases	45
III. Market Beta Statistics Based on Holding Period Return from January 1964 through December 1975 for CP Limited and Companies in Which They Have a Substantial Interest	76
IV. Earnings Beta Type Statistics for Certain Companies in Which CP Limited Have a Substantial Interest	77
V. CP Rail and CP Grain Market Beta Estimated from Earnings Beta	83
VI. Comparison of Physical Volume Betas with Earnings Betas for Selected Companies	87
VII. Mean Absolute Percentage Deviation in Earnings from the Trend Value in Earnings for Selected Companies or Divisions	90
VIII. Hypothetical Cost of Funds Computation	99
IX. Realigned Hypothetical Cost of Funds Computation	100
X. Consequences of Different Capital Structures for Regulated and Unregulated Subsidiaries Traditional Position	106
XI. Restatement of Traditional Approach Income Statement II	109
XII. Consequences of Different Capital Structures for Regulated and Unregulated Subsidiaries Modigliani - Miller Position	111

## TABLE OF CONTENTS (Cont.)

<u>Tables</u>	<u>Page</u>
XIII. Canadian Pacific Limited Capital Employed in the Rail Enterprise	113
XIV. Railway and Non-Railway Capital Structures of Canadian Pacific Limited	115
XV. Comparative Capital Structures and Rates of Return for Solvent U.S. Railroads and All U.S. Investor-owned Electric Utility Companies	116
XVI. Percentage Weighting of Capital Structure for CP Grain as Proposed and Utilized by Provinces	117
XVII. CP Limited Capital Structure and Capital Funds Rate Utilized in Commission's Cost Calculations	120
XVIII. CP Limited Capital Structure and Capital Funds Rate Including Deferred Taxes as Debt at Zero Interest Rate	127
XIX. CP Limited Capital Structure and Capital Funds Rate With Deferred Taxes Added as Equity at 14.50% but Tax Rate Reduced to Effective Rate	129
XX. Canadian Pacific Limited - Rate of Return on Net Rail Investment	130
XXI. Canadian Pacific Limited Summary of Working Capital Position and Inventory Balances December 31, 1956 to December 31, 1974	134
XXII. Effect on Capital Funds Cost of Including Working Capital in CP Ltd. Capital Structure and Asset Base	135
XXIII. Effect of Combining Allowance for Deferred Taxes in Capital Structure and Allowance for Working Capital in Asset Base	136

## TABLE OF CONTENTS (Cont.)

<u>Tables</u>	<u>Page</u>
XXIV. Canadian Pacific Ltd. Embedded Cost of Debt Capital Employed in the Rail Enterprise	151
XXV. CP Limited Embedded Cost of Debt for Year 1974	162
XXVI. Provincial Development of the Weighted Average Capital Funds Rate for Preferred Stock	159
XXVII. Canadian Pacific Limited (Consolidated) General Financial Characteristics	179
XXVIII. C. P. Ltd. Growth in Dividends and Earnings to 1974	200
XXIX. CP Limited (Consolidated) Earnings and Dividend Growth, 1964-1975 after Extraordinary Items	201
XXX. Effect of Weighted Average and Number of Years on Dividend Growth Estimates for C.P. Limited	202
XXXI. Possible Growth Rates for $B = 0.45$ with New Investment Return	219
XXXII. Marginal Return on New Investment	220
XXXIII. Earnings/Price Ratios for Selected Companies from Dr. Quirin's Quintiles 1 & 2 with Market/Book Ratios within 20 Percent of 1 and within 10 Percent of 1	229
XXXIV. Historic Ratios of Earnings over Price Canadian Pacific Limited 1969-1975	233
XXXV. Market-Book Ratios of Companies in Which C.P. Ltd. Has Significant Shareholdings	238
XXXVI. 1974 E/B and M/B Ratios of Six Regulated Companies	250



## TABLE OF CONTENTS (Cont.)

<u>Tables</u>	<u>Page</u>
XXXVI. Rate of Return on Average Common Book Equity as Related to Risk	251
XXXVII. Other Canadian Regulatory Proceedings 1974- 1976 -- Allowed Rates of Return and Basic Stock Information	258
XXXVIII. Comparative Capital Structures and Rates of Return for Solvent U.S. Railroads and All U.S. Investor-Owned Electric Utility Companies	272
XXXIX. Imbedded Interest Rate on CNR Debt - 1974	283
XL. Provincial Summary of Box Car Data	336

TABLE OF CONTENTS (Cont.)

<u>Figures</u>	<u>Page</u>
I. Theoretical Relationship between Required Return and Risk	59
II. Diagram Showing Relationship of Cost of Funds Rates and Capital Structure Comparison	102
III. Canadian Pacific Limited Earnings and Dividends per Share Each Year 1964-1975	177
IV. Earnings of Canadian Pacific Limited as a Function of Time 1964-1974	209

## PREFACE

Volume I of the Report of this Commission purposely contained only the essential details of the data submitted by the railways, provinces, producer groups and elevator companies and the data and accompanying analyses assembled by the Commission. At many points throughout Volume I of the Report, it was stated that a Technical Appendix containing the details of the data and analyses underlying the Commission's decisions would be issued subsequently. That commitment is fulfilled in this and the accompanying Volume of the Technical Appendix. This volume, entitled Capital Costs, encompasses the details of all capital-related costing issues. The accompanying Volume, Non-Capital Costing Issues, includes data, analyses and conclusions relating to the other issues presented to the Commission.

This volume sets forth the details underlying the Commission's analysis and decisions regarding capital costs, as summarized in pages 67 through 105 of Volume I of the Report. The topics of those pages are examined in the same sequence, though the expanded discussion has required the identification of additional chapters and subheadings.

In addition, this volume contains three detailed listings related to the Commission's hearings that were not included in Volume I of the Report. Schedule I is a listing of submissions

and their sponsors for the initial and rebuttal hearings of the Commission. Schedule II is a listing of the spokesmen for each of the parties that appeared before the Commission. And, Schedule III contains an exhaustive listing of the exhibits submitted to the Commission during the course of the Winnipeg, Regina and Orillia hearings.

## CHAPTER I

### COMPONENTS OF CAPITAL COST

Throughout this Commission's Inquiry, the term capital cost has referred to the costs associated with the ownership of assets used in the transportation of statutory grain. This cost of ownership manifests itself as both a cost associated with the funds expended in acquiring the rights to the use of the assets, and a cost associated with the continued ownership of the assets. The first of these is generally referred to as depreciation and the second as capital funds cost (or, somewhat erroneously, cost of money or interest). As was the case with some maintenance expenses, neither<sup>\*</sup> of these two costs may appear as a cash expenditure of the corporation during a single financial period. However, both are recognizable costs and represent the consumption of resources. Where such consumption does not coincide with a related accounting entry, the proper cost<sup>\*\*</sup> attributable to the period must be estimated. For clarity of the exposition which follows, we repeat here

---

<sup>\*</sup> with the specific exception of some debt charges which will be discussed later.

<sup>\*\*</sup> This is consistent with the Commission's acceptance of "the broader economic concept of costs for this study" (see Report, Volume I, pp. 30 and 31).



the terminology defined in Volume I of the Report<sup>\*</sup> of this Commission:

- capital cost--the sum of the depreciation expense and the capital funds cost.
- depreciation expense--the provision for recovery of the funds invested in depreciable assets.
- capital funds cost--the cost of debt and equity funds including, where appropriate, a provision for income tax on equity funds (the capital funds cost is not a percentage rate, it is an absolute number of dollars).
- capital funds rate--the percentage rate applied against the net asset base to derive the capital funds cost (this is a weighted average of the debt funds rates and equity funds rates, as discussed later).

### Depreciation Expense

Depreciation expense arises from the amortization of an expenditure for the purchase of an asset which is expected to provide useful service for a period in excess of one year. There are several methods<sup>\*\*</sup> of estimating

---

<sup>\*</sup> Report, Volume I, p. 68.

<sup>\*\*</sup> Some of the possible choices are: good-as-new method, direct appraisal method, arbitrary lump sum method, percentage of revenue method, sum of digits method, declining balance method, straight line method, multiple straight line method, user straight line method, sinking fund method and present worth method. For a fuller explanation of these, see Engineering Valuation and Depreciation, Marston, Winfrey and Hempstead, Iowa State University Press, (Iowa, 1953).

depreciation and several choices<sup>\*</sup> of asset values which may be chosen for amortization. Although depreciation can be associated with the condition and usefulness or value of physical property, it must be an estimated quantity. This is because the ultimate salvage value of the property and its remaining service life both lie in the future and cannot be known with certainty. Regardless of the method used to reflect depreciation charges in the accounting records on a year-to-year basis, the total cost of depreciation recorded in the corporate accounts will ultimately be the same. That is, it must be equal to the depreciation base<sup>\*\*</sup> minus the realized salvage value at the retirement. The various methods of determining or recording depreciation differ only in the manner in which they distribute the depreciable base (depreciation base less estimated salvage value) over the useful life of the property.

---

<sup>\*</sup> Under varying circumstances original cost, reproduction cost, replacement cost, combined current and historical costs, and salvage values have all been used as the base on which depreciation calculations were performed; also, single units of property and groups (continuous or vintage) of assets have been used. For further details, see Public Utility Accounting: Theory and Application, James E. Suelflow, MSU Public Utilities Studies, Michigan State University, 1973.

<sup>\*\*</sup> The original, replacement or combination cost or value or any similar amount which is to be allocated or adjusted for depreciation.

## Capital Funds Cost

The capital funds cost represents the cost of utilizing funds and may be related to the assets of the corporation. Where a company borrows funds (through debentures, trust certificates, bonds, etc.) for the purchase of assets, the debt charges (interest) reflect the capital funds cost associated with that purchase. Where a company raises these funds through the issuance of stocks (preferred or common), the return\* which the investor in these stocks requires is the capital funds cost associated with the assets purchased with those funds.

A company also may choose to purchase assets from its after-tax retained earnings. In this case, the funds are available for the asset purchases because they were not distributed as dividends. As such, these funds have a cost similar to the cost of funds raised through stock issues. This is because the alternative approach would be to distribute all of the company's after-tax earnings to existing shareholders as dividends and then to raise the required investment funds in

---

\* That return will be reflected as dividend payments, capital appreciation or a combination of both.

the equity market through the issuance of new stock shares.\* Irrespective of whether a company sells shares to receive cash or utilizes retained earnings in the form of cash for the purchase of assets, the source of funds is not distinguishable. When funds are transferred from cash-on-hand to purchases of assets, the accounting transfer of the dollars does not increase nor decrease the value of the company.\*\* The use of retained earnings to finance asset purchases creates a cost which is embodied in an increase in the prospective earnings expectations of the equity investors. Hence, if the funds are retained, they must earn an adequate return.

The taxation treatment of capital funds cost varies according to the source of the funds. Generally, interest charges for funds obtained through debt financing are recognized as operating costs for tax purposes. Thus, they are

---

\* In essence, the retention of earnings for purchase of assets results in an involuntary additional equity investment in the company by the existing equity shareholders. If such action on the part of the company is unsatisfactory, a shareholder may choose to offer his shares for sale.

\*\* It will likely increase the prospective value of the company and will provide an alternative revenue earning source for the company. But, the immediate effect will be no change in value.

included with other costs such as wages, fuel and maintenance as a deduction from revenues prior to the calculation of the tax liability. On the other hand, payments to shareholders for the provision of equity funds are not considered deductible expenses for tax purposes. They become a cash expenditure only when the company achieves sufficient revenues which cover all of its expense obligations (including the annualized depreciation allowance for previous asset purchases) and provide the additional after-tax dollars available for distribution to shareholders.

The company must meet its debt obligations<sup>\*</sup> if it is to remain solvent over the long run. Failure to do so could force bankruptcy, would likely jeopardize the firm's ability to obtain future debt financing and would certainly imply such a risk that future debt financing, if available, would be more costly. Payment of dividends on the other hand is a cash outlay which the company may defer or forestall. When such payments are deferred and when comparable funds

---

\* These obligations may be deferred with the agreement or approval of the debt holder. Such approval usually occurs when the financial position of the firm is poor or when the firm is unable to meet its periodic interest requirements. Under such circumstances the debt holder may feel that his investment will be best protected through continued operation of the company rather than through his forcing bankruptcy.



are not reinvested so as to increase the value of shareholders' equity in the company, then the value of the stock is likely to fall and the terms under which the company can generate additional capital funds will likely cause an increase in the capital funds costs. Also, if the company does not generate sufficient revenue to provide for the replacement of existing assets as they are retired, then the value of the company's stock will likewise fall.

The fact that a company fails to pay dividends or reinvest comparable funds does not mean that a cost has not been incurred for the use of its equity funds. Such failure will be reflected in increased capital funds rates and successive loss of access to potential capital markets. Depreciation expenses must be viewed in exactly the same way. The fact that depreciation expenses do not manifest themselves as direct cash outlays does not imply that the company has not incurred a depreciation cost. Such cost is reflected in the deterioration in the physical state of the assets and the diminishing of their future earnings potential.

The task of this Commission was to determine the capital funds rate, the value of the gross and net asset base and the depreciation cost which would produce a reliable estimate of the "true" cost of the capital employed in the rail transportation of grain moving under the statutory rates.



## CHAPTER II

### LEGISLATIVE AND REGULATORY BACKGROUND

Capital funds cost is not identified as an item of expense in the Uniform Classification of Accounts<sup>\*</sup> and the legislation affecting Canadian railways does not appear to set forth a specific methodology for the determination of an approved capital funds rate or a rate base (net asset base) to which it is to be applied. Past judgments, orders and regulations affecting the railways also have not produced clearly defined guidelines for treating the capital funds cost component. However, the items of legislation and regulation affecting the railways do include references to this cost.

#### The Railway Act

In section 330 of the Railway Act,<sup>\*\*</sup> direction is given to the Canadian Transport Commission that:

330. (1) The Commission (CTC) shall by regulation prescribe for any of the purposes of this Act the items and factors, including the factors of depreciation and the cost of capital as provided in subsection 329 (1), which shall be relevant in the determination of costs, ...

---

<sup>\*</sup> Uniform Classification of Accounts for Class I Common Carriers by Railway, Board of Transport Commissioners for Canada, 1959.

<sup>\*\*</sup> Railway Act R.S., c.234, s.1.

The reference to the previous subsection is:

329. (1) In computing the costs of the undertaking of the company for the purposes of sections 252 to 261, 264, 272, 276, 277, 278, 330 and this section, there shall be included such allowance on a periodic basis

. . .

(a) for depreciation, and

(b) in respect of the cost of any money expended, whether or not the expenditure was made out of borrowed money, as to the Commission (CTC), seems reasonable in the circumstances.

By explicit reference, section 276 of the Act requires that in the computation of compensatory rate levels,

the Commission (CTC) shall

. . .

(b) compute the costs of capital in all cases by using the costs of capital approved by the Commission as proper for the Canadian Pacific Railway Company

and in the determination of a fixed rate under section 278,

the Commission (CTC) shall

. . .

(b) compute the costs of capital in all areas by using the costs of capital approved by the Commission as proper for the Canadian Pacific Railway Company;

Nowhere else does the Act specifically refer to the determination of, or inclusion of, a capital funds cost component.

In the words of the Railway Transport Committee (Committee),  
in Reasons for Order No. R-6313:\*

In the exercise of its power to prescribe cost items and factors, the Commission (CTC) has a broad discretion which is limited only by its duty to include such allowance for depreciation and cost of money (or capital), as to it seems reasonable in the circumstances. ... The words in section 329 (1), ..., means that the railways have a statutory right to an allowance and that the Committee has a duty to fix a reasonable amount in respect of that allowance. However, we are satisfied that in our discretion, so limited, we may allow depreciation or cost of capital on different bases, or at different rates, for different purposes of the Railway Act.

#### Canadian Transport Commission

The Regulations issued by the Committee in August 1969 under Order No. R-6313 contained the following provisions for the determination of the capital funds cost:

- (3) In computing the costs of the undertaking of the company for the purpose of Sections 253 (application for abandonment) or 260 (application for discontinuance), there shall be included an allowance for cost of capital as follows:
  - (a) either
    - (i) the rate of return on capital excluding any allowance for income tax, which, in the opinion of the Committee, is

---

\* Canadian Transport Commission, Railway Transport Committee, Reasons for Order No. R-6313 Concerning Costs Regulations, Order No. R-6313, August 5, 1969, published as Pamphlet No. 15, pp. 332 and 333.



appropriate for Canadian Pacific Railway Company at the time the application is made, applied to the salvage value of the road property which the railway proposes to retire if the line is abandoned or the service discontinued, to an amount not exceeding the net book investment, computed on the basis of the group plan of accruing depreciation;

or

- (ii) the rate of return on capital excluding any allowance for income tax, which, in the opinion of the Committee, is appropriate for the Canadian Pacific Railway Company at the time the application is made, applied to the net book investment of the road property which the railway proposes to retire if the line is abandoned or the service discontinued, provided the applicant railway can develop depreciation charges and net investment calculations acceptable to the Committee as reflecting the specific aging characteristics of the road property;
- (b) the rate of return on capital excluding any allowance for income tax, which, in the opinion of the Committee, is appropriate for Canadian Pacific Railway Company at the time the application is made, applied to the net book value of all other property which the Committee is satisfied is required in the operation of the line or service.
- (4) In computing the costs of the undertaking of the company for the purpose of Sections 256 (determination of actual loss), 258 (claim for actual loss where abandonment is prohibited) or 261 (computing actual loss for passenger), there shall be included an allowance for cost of capital as follows:

- (a) the rate of return on capital excluding any allowance for income tax, which, in the opinion of the Committee, is appropriate for Canadian Pacific Railway Company at the time the computation is made, applied to the salvage value of road property which the Committee is satisfied is required for purposes of continued operation of the line or service, to an amount not exceeding the net book investment computed on the basis of the group plan of accruing depreciation;
- (b) where the Committee is satisfied that investments in new assets are necessary for the continued operation of the line or service, there shall be applied to the net book value of such investments the rate of return on capital excluding any allowance for income tax which, in the opinion of the Committee, is appropriate for Canadian Pacific Railway Company at the time the investments in new assets are made;
- (c) the rate of return on capital excluding allowance for income tax which, in the opinion of the Committee, is appropriate for Canadian Pacific Railway Company at the time the computation is made, applied to the net book value of all other property which the Committee is satisfied is necessary for continued operation of the line or service.\*

This finding and the corollary section requiring the separation of costs into four categories, the last of which was "Category IV cost, being the cost of capital calculated on the investment and the rate approved by the Board," did not bind the CTC to any specific rate base or rate of return.

---

\*Ibid., pp. 434 and 435.

In deciding not to include a fixed or definitive rate of return on capital, the Committee did not leave the problem totally unresolved. It decided to "adopt certain principles and constraints in the computation of rate of return in the future."\* These six principles may be summarized:

- the composite embedded rate of interest for outstanding Canadian Pacific debt will constitute the rate floor,
- the calculated rate of return should include a return to equity capital which, due to higher risk, should normally exceed current market interest rates,
- the return to equity capital should "acknowledge the liability for income tax on all earnings by equity capital regardless of whether the railway, as a system, paid income tax in that year,"\*\*
- for actual loss calculations, no allowance for income tax should be made,
- due to inert assets in the net investment of Canadian Pacific, the rate of return should be less than a rate obtained from a standard rate base-rate of return computation, and
- "In assigning a rate of return, the Committee must again consider the various purposes of costing under the Act. For the rate-related sections ... and for applications to abandon branch lines ... or discontinue passenger-train services ..., we have determined that costs shall be those of a 'going concern', with normal depreciation."\*\*\*

---

\* Ibid., p. 359.

\*\* Ibid., p. 360.

\*\*\* Ibid., p. 361.

These guidelines and regulations are transformed annually into capital funds rates of return by the Railway Transport Committee under the rate base-rate of return approach. This procedure

identifies the debt portion of a railway total net book investment and assigns to it the corresponding interest costs. The residual investment not covered by debt is presumed to be equity capital and receives a rate of return designed to reflect its relatively greater risk as compared with bonded debt. This return to equity is then virtually doubled to account for the tax liability associated with it. The sum of these three payments, to debt (interest), to equity (profit) and to government (income tax) is related by ratio to the net book investment of the railway. That ratio is presumed to be the needed rate of return for all investment.\*

#### Application of Capital Cost in Canadian Regulatory Context

For 1974, the CTC approved capital funds rates for Canadian Pacific were 8.90 percent with no allowance for income tax and 17.04 percent including an allowance for income tax. Later chapters of this Volume examine the development of these rates in considerable detail and relate them to the process of capital funds rate determination undertaken during this Inquiry. Given the CTC approved capital funds rate, the railways then assign the

---

\* Ibid., p. 356.

variable portion of the capital funds cost to traffic movements under the various purposes of the Act. The Costing Manuals of Canadian National and CP Rail explain the procedures utilized in developing this variable capital funds cost.

CP Rail generally develops variable capital funds cost in a three step procedure that is consistent with the guidelines set out in Cost Order No. R-6313. First, the gross investment in similar property accounts is related to the appropriate service units to develop gross investment coefficients.\* The gross investment coefficients are multiplied by the ratio of net investment (gross investment less accumulated depreciation) to gross investment to obtain net investment coefficients related to service units. These latter coefficients are multiplied by the approved and appropriate\*\* capital funds rate to yield the variable portion of the capital funds cost identifiable with the specified

---

\* Schedule IV of this Volume contains a summary of these procedures and related service units.

\*\* The appropriate capital funds rate is dictated by the governing section of the Railway Act.



service units. In the area of specific costs,<sup>\*</sup> the approved capital funds rate is multiplied directly against the calculated net book investment of the specifically involved assets to yield the total component (not a unit cost) for capital funds cost.

The Committee concluded that the present capital structure of Canadian National should not be used as a basis for developing a capital funds cost for Sections 252 to 261 of the Act. Since the Act requires that the Canadian Pacific rate be used for Sections 264, 272 and 276-278, the Committee directed that the Canadian Pacific capital funds rate be used for Canadian National for all costing purposes under the Act.<sup>\*\*</sup> In developing the capital funds cost, CN combines a number of procedures, utilizing some CP cost data. Generally, this involves the application of the CP roadway property net-to-gross ratio to the CP roadway regression model and CN equipment net-to-gross ratios to CN equipment gross investment coefficients with the results being multiplied by the approved CP capital funds rate.

---

<sup>\*</sup> Specific costs are preferred under the Cost Order and, in this case, represent the capital funds cost directly related to an identifiable asset that is to be specifically costed (such as a passenger station); Op. Cit., p. 437.

<sup>\*\*</sup> Ibid., p. 361.

The current procedures of CN and CP are fairly straightforward. There is, however, one complicating factor in that the Committee requires that the approved capital funds rate "should be lower than a rate calculated by means of a conventional rate base-rate of return method" to account for "inert assets."\* Conceivably, this could distort the capital funds cost component in the costing of a specific commodity since an "artificial" capital funds rate for all assets may be applied to the investment base of a specific group of assets.

The existing approaches utilized by CN and CP and as directed by the CTC and Cost Order No. R-6313, are not, by any means, the only approaches that can be supported from the logical foundations of economic theory and accepted practice. Most of the alternatives presented to this Commission have been argued before other commissions (such as the 1968 Cost Inquiry) and regulatory tribunals.

The present practice of the CTC and the Canadian railways, as described above, is to develop the capital funds

---

\* Ibid., p. 360.

cost through the rate base-rate of return approach.<sup>\*</sup>

Previously, the Board of Transport Commissioners used an approach known as permissive earnings. Under this concept, tariff rates were permitted to exceed general operating expenses and fixed charges (such as debt obligations) by an amount equal to an allowance for dividends of four percent on preferred equity, five percent on common equity and a surplus which was to approximate a return of two percent on total rail investment.

During the Cost Inquiry in 1968, the Provinces<sup>\*\*</sup> advocated the adoption of the cash flow method of measuring capital costs. In essence, this approach suggests that depreciation charges and "hypothetical costs of borrowing" be abandoned for all costing purposes. According to the Provinces, the cash flow requirements of the railways were the annual expenditures required to maintain a modern, viable plant (i.e., expenditures for purchasing new or rebuilding old capital equipment) plus the interest and dividends needed to fulfill debt obligations and the expectations

---

<sup>\*</sup> This is the procedure which was ultimately adopted by this Commission--though the values obtained by this Commission differed from those developed by the CTC.

<sup>\*\*</sup> Here we refer to all ten Provinces; except where noted, however, our reference to Provinces means only Alberta, Manitoba and Saskatchewan.

of shareholders. The Provinces contended that the cash flow method generally produces a lower estimate of capital costs than the rate base-rate of return method for a slowly growing firm and that under this approach

heavily utilized portions of the rail plant would be allocated more investment per year than lightly utilized portions or portions which are candidates for abandonment.\*

As noted in the Reasons for Order No. R-6313, the consultants to the CTC argued that the cash flow approach was circular such that a profitable railway could justify high rates of return and, conversely, an unprofitable railway could justify only low rates of return.\*\* To the extent these rates of return affected subsidies and rate levels, they could then become "self-fulfilling" so that the effect would be contrary to the public interest. In stating their findings, the Committee agreed with the

---

\* Submission of the Provinces of Alberta, British Columbia, Manitoba, Ontario, Quebec, Saskatchewan, and the Maritime Transportation Commission Representing the Provinces of New Brunswick, Newfoundland, Nova Scotia and Prince Edward Island to Railway Transport Committee, Canadian Transport Commission in the Matter of Railway Costing Procedures and Related Matters, August, 1968, p. 54.

\*\* Op. cit., p. 358.

circularity argument of the staff consultants.\*

During that Inquiry, the CTC consultants also advanced the so-called "sunk cost concept" for determining depreciation charges on property proposed for abandonment. Under this approach, the railways' year by year forecast of capital expenditures needed to maintain the property in operation would be used in lieu of depreciation charges. "Depreciation of any property which would continue in use elsewhere on the railway, and depreciation of salvage value, if any, should be allowed."\*\*

Canadian National agreed with this approach for actual loss calculations but argued that depreciation for assets other than uneconomic branch line properties and passenger car equipment on uneconomic services should be calculated on the basis of current replacement costs, rather than historical costs. In addition, they argued that the road property capital assets, for uneconomic lines to be continued in operation, should be taken out of the railway capital accounts and all "future capital investments in the line

---

\* Ibid., p. 359.

\*\* Ibid., p. 345.



would be treated as operating expenses in the year in which that investment is made ... (and) would be financed by direct subsidy."\*

Canadian National also advanced the consistent use of current asset values for all capital costing purposes under the Railway Act:

This, (they argued) would yield better investment valuations in the case of Canadian National, and more reliable costs than data based on actual or estimated historical costs. The position of Canadian National is that book values based on historical costs and conventional depreciation methods measure only the unamortized portion of the original cost of capital assets, which does not provide satisfactory asset valuations as reflected by their current economic value.\*\*

The Committee rejected this proposal as not of use for regulatory purposes.

The appropriateness of using an original (historic) or current value for the investment base was raised as an issue before this Commission. As will be described later, the two valuation methods are essentially reconcilable through the inclusion or exclusion of an inflation premium within the appropriate capital funds rate. The CTC procedure, under Cost Order No. R-6313, utilizes an original (historic) valuation base for the determination of capital funds costs.

---

\* Ibid., p. 346.

\*\* Ibid., p. 351.

Such a procedure implicitly incorporates the necessary allowances for inflation in the capital funds rate.

Interestingly, Regulations 3.(3)(a)(i) and 3.(4)(a) of Order No. R-6313 (quoted in their entirety at pages 11, 12, and 13) specify the use of salvage value (up to an amount not exceeding net book value under group depreciation) as the appropriate asset base on which to calculate the capital funds cost component. Elsewhere in those Regulations, salvage is defined to refer to annually computed amounts. Such a procedure explicitly utilizes current economic values as the asset base so long as such value is below the original cost, net book value.

It was against this general background that the Commission and all of the parties to this Inquiry explored procedures for determining the applicable costing of the capital employed in the transportation of grain by rail. The remainder of this Volume examines the alternative measures of asset values, the impact of the risk of grain transportation, the capital structure and cost of funds rates, capital costs for Canadian National, capital costs associated with the Government hopper cars and, finally, the issues relating to group depreciation and specific asset values.



## CHAPTER III

### ALTERNATIVE VALUATION BASES

The issue of an appropriate valuation base for the determination of capital costs has existed for several decades. The issue arises from the fact that prices and the purchasing value of money do not remain constant over time. Though the principle holds that both price increases and price decreases have impact on investment decisions and costs, it has been the preoccupation with the former which has generated much of the controversy. In periods of inflation, the current price of replacement assets generally exceeds the original price of the retiring assets which they are replacing. This is generally true, despite technological improvements which may have reduced the relative costs of producing similar assets. For railways, the problem of asset price inflation appears more exaggerated than for many other industries because the units of railway property are relatively long-lived\* and because there have been few major technological advances in the railway industry - particularly over the past twenty years.

---

\* Typically, many units (such as freight cars and locomotives) are expected to provide useful service of 20 to 40 years while some are expected to provide in excess of 100 years of useful service.

## Definitions

When referring to different valuation bases and price inflation, several terms are frequently used. Without precise definition and unless all parties work from the same basic terms, confusion is bound to arise. During the hearings such confusion did arise.\* To prevent this, we have summarized here, the necessary terms:

- Original Cost: A recorded expenditure required to procure and install a unit of property when first acquired by the company, using prices and costs which prevailed at the time of acquisition. This is also known as "historical cost."
- Replacement Cost: The estimated current cost (or cost prevailing at a specified evaluation time) of a new unit of property which will maintain the same level of service or capacity of an existing unit of property. Under the replacement cost concept the new units of property can be different from the existing property units so long as they will provide a service that is consistent with that which was provided with the original existing property unit.
- Reproduction Cost: The estimated current cost of new units of property that are identical to the units of property now in existence. Some limits may be placed on a strict interpretation of this concept since the passage of time may preclude the reproduction of identical units.
- General Price Level Adjusted Cost (GPLAC): The estimated cost of replacing existing units of property which is derived by multiplying the original cost of all property taken together by

---

\* Transcript, Vol. 12, p. 2146.



a price index. A similar process wherein the original cost of each property item is multiplied by an appropriate cost index is referred to as "trended cost."

- Current Cost: Costs expressed in terms of dollars equivalent to the present purchasing power of a dollar.
- Real Cost: Costs expressed in dollars of constant specified purchasing power. Under this concept, assets purchased at different points in time are all valued in terms of the purchasing power of the dollar at a specified point in time. Current costs are a specific instance of this, where the specified point in time is the current year. Other instances of real cost can use previous years as the specified time: e.g., "dollars expressed in units of 1967 purchasing power."
- Nominal Cost: Costs unadjusted for changes in the purchasing power of the dollar--the antithesis of real costs.

### The Valuation Issue

The basic issue before this Commission was whether it was preferable to develop capital costs on the basis of an original cost valuation base or on the basis of one of the current value rate valuation bases. The word "preferable" is used because both cost of capital experts\* agreed that either valuation base could be used to produce appropriate capital costs.

---

\* Dr. Myron J. Gordon on behalf of the Provinces of Alberta, Manitoba, and Saskatchewan, assisted by Dr. J. E. Elton, and Dr. G. David Quirin on behalf of Canadian National and CP Rail, assisted by Dr. W. R. Waters.

In their initial submission, the railways structured the valuation base issue in the following fashion:

What flow of compensation, via the capital cost component, will be the minimum necessary to attract the required amount of capital to maintain output into the future?... a multiplicity of possible streams will perform the required capital attraction function ... all of these streams must be equivalent in terms of risk-adjusted real present value. The choice from among these possible streams must be made on grounds other than capital attraction, since all are capable of performing the capital attraction function. Possible bases for such a choice include the effective real cost to customers, the appropriateness of the matching between components of the income stream thus generated and cost responsibility of particular generations of customers, and, possibly, the preservation of equity between different generations of shareholders.\*

This statement was made in the context of the general objective of the railways to find a rate of return which, in light of the conditions extant in 1974, would generate earnings on the rail investment related to grain transportation sufficient to attract and retain capital needed "to maintain this as an ongoing enterprise."\*\*

Against this foundation, the railways agreed that:

There are thus two valuation base-cost of funds rate combinations which can attract capital in the face of anticipated inflation. These are:

---

\* Exhibit R-4, p. 5.

\*\* Transcript, Vol. 35, p. 6667.

- (a) historical cost valuation with required nominal yields;
- (b) Current value valuation with required real yields.\*

The selection of a valuation base involves, among other things, a decision as to where the risk of unanticipated inflation will be borne. Where historical cost valuation is used, the risk of unanticipated inflation or, more precisely, the risk that inflation rates will differ from those generally expected, will be borne by investors. Where current cost calculation is used, the risk disappears, because the costs of inflation are compensated for as they occur. The fact that risks of unanticipated inflation must be borne by shareholders in the former case means that there will be a risk premium in the former case, and that expected real present values, prior to adjustment for risk will not, ordinarily be equal.\*\*

Though disagreeing with the ultimate recommendation of the railways, the Provinces agreed with the prefatory discussion. According to the position of the Provinces, the choice between historical cost and current cost methods was predicated on the following three criteria:

- the method should be logically consistent with the purposes for which the cost estimates are being developed,
- the chosen method should be least difficult of the alternatives to implement in practice, and
- the method should be consistent with common practice in regulatory jurisdictions.

---

\* Exhibit R-4, p. 24.

\*\* Ibid., p. 8.

Though they contended that the satisfaction of these three criteria led to the adoption of historical costs, they did concur with the railways that either base could produce acceptable results:

It will be acceptable to the investors if they are allowed the current required yield on the replacement cost of the assets that correspond to their investment. It will also be acceptable to them if the corporation is allowed the required yield on the dollar amount actually invested, the historical cost of the assets.\*

The basic approach adopted by the Provinces was:

to arrive at a cost figure such that if the company earned that rate of return on its existing assets and could be expected to earn that on the total assets in the future, the cost figure so determined which would involve the current interest rate on additional debt and the current cost of equity capital on additional equity capital, it would find it was in the interest of the company or at least not against the interest of the company and its stockholders to undertake the additional investment in the facilities required to carry grain that was found to be necessary.\*\*

#### Equivalence of Approaches

Before proceeding to the discussion of the relative merits of adopting either the historical cost approach or

---

\* Exhibit AMS-2, page 57.

\*\* Transcript, Vol. 35, page 6667.

the current cost approach and the Commission's decision on the appropriate valuation to be used in this instance, it is useful to show the equivalence between the two approaches. In order to maintain the proper perspective, it must be emphasized that the question which is being asked is this:

Is it possible to determine a NOMINAL capital funds rate (including an allowance for anticipated inflation) which, when applied to the net asset base determined from ORIGINAL cost values, and combined with depreciation expense allowances calculated from the same ORIGINAL values, will yield the same sufficient funds in times of inflation, as will depreciation expense allowances calculated from CURRENT asset values and a REAL capital funds rate (reflecting time-preference but with no allowance for inflation) applied to net asset values determined from CURRENT cost values?

According to all of the evidence presented to this Commission, the answer to this encompassing question is YES.

During the course of the extensive hearings into the issue of capital costs,<sup>\*</sup> the Commission asked Dr. Quirin to provide a "simplistic table" which shows what happens to depreciation and capital funds costs under the two rate base valuation concepts. Exhibits R-61, R-62 and R-63 were

---

<sup>\*</sup>Of a total 36 days of hearings, all or part of 15 days dealt with this issue.



presented in response to this request and have been reproduced as Schedule V to facilitate the explanation of this section.

All three examples (i.e., example A: STABLE PRICES - HISTORIC COST VALUES; example B: RISING PRICES - HISTORIC COST VALUES; and example C: RISING PRICES - CURRENT COST VALUES) relate to an enterprise that has four shovels which cost \$10.00 each, when new. At the beginning of the first year, the shovels are evenly aged so that the first is brand new, the second is one year old, the third is two years old and the fourth is three years old. When new, each shovel has an expected service life of four years with no salvage value remaining at the end of the fourth year.\* Depreciation is calculated on a straight-line basis and the shovels are rented out "to someone who uses them to clean his barn."\*\* The rent consists of the depreciation charge plus an eight percent return on net investment. In order to simplify the exposition, it is assumed that depreciation is "taken" on the last day of each year, the fully used shovel is retired at the end of that day and the new shovel to replace it is bought on the following morning at the beginning of the new year.

---

\* The shaded area always represents the amount of useful service life which has been "consumed" in previous years. Normally, 1/4 of this useful service life is expected to be consumed each year.

\*\* Transcript, Vol. 36, p. 7051.

In example A (STABLE PRICES - HISTORIC COST VALUES), we can trace the history of each shovel. The first one was brand new at the start of year one and had a book value of \$10.00. In year two this value drops to \$7.50, \$5.00 in year three, \$2.50 in year four and at the end of year four it is all used up and replaced with a new shovel at the beginning of year five. The "depreciation throw-off" from that shovel is \$2.50 per year. For all four shovels combined the enterprise has an annual "depreciation throw-off" of \$10.00 which is used to purchase a new shovel at a cost of \$10.00. The net book value of \$25.00<sup>\*</sup> remains unchanged each year, and at eight percent generates \$2.00 per year of available net income.<sup>\*\*</sup>

Example B (RISING PRICES - HISTORICAL COST VALUES) also uses historical or original cost values. However, in this example it is assumed that the price of a shovel rises from \$10.00 to \$11.00 at midnight on December 31 of year one and all future shovel prices remain static at \$11.00 from that point forward. In this case, the historical value of the first shovel (beginning brand new) falls from \$10.00

---

\* Notice that gross book value is \$40.00 each year.

\*\* This net book value is shown as "Valuation Base," the first line below the illustrated shovels. The eight percent available net income is shown as "8% Return" five lines below that.

to \$7.50 to \$5.00, and to \$2.50 and then is replaced at \$11.00. Similarly, the second shovel beginning at \$7.50, falls to \$5.00 and \$2.50 in successive years and is replaced at \$11.00 in year four. Depreciating the increased historical value (i.e., \$11.00) on a straight-line basis produces net investment values of \$8.25 in the beginning of the second year after purchase (e.g., year 3 for shovel 4), \$5.50 at the beginning of the third year and \$2.75 at the beginning of the fourth year. The net book value of the four shovels, on a historical cost basis, rises from \$25.00 in the first year, to \$26.00 in the second, \$26.75 in the third, \$27.25 in the fourth and \$27.50 in the fifth and sixth. Looking at the source and application of funds, we find that depreciation, based on historical book values, provides \$10.00 at the end of year one for the purchase of the new shovel at the beginning of year two. However, with the price increase, this depreciation "throw off" is deficient by \$1.00 in the provision of sufficient funds for the continued renewal of the assets. In the second year, with the depreciation provided from the historical cost value of one shovel at the new price and three at the old, depreciation provides \$10.25 for the purchase of the \$11.00 shovel at the beginning of year three -- a depreciation shortfall of \$0.75. As more and more shovels are replaced at the new higher price, this depreciation shortfall diminishes to the

point where, in the fifth year, depreciation provides exactly sufficient funds for the purchase of the new shovel in year six. As before, the rental payment includes an allowance for a return of eight percent on net book value. With the gradual increase in this value, as the higher priced shovels replace the older shovels, the return rises from \$2.00 to \$2.08 to \$2.14 to \$2.18 during the first four years and then stabilizes at \$2.20 in the fifth and sixth years.

Example C (RISING PRICES - CURRENT COST VALUES) assumes the same \$1.00 increase in the price of shovels on December 31 of year one as did example B. However, this example utilizes current cost values after the price increase. As a result, the revaluation of each shovel to the current value of the unexpired service life provides sufficient funds from depreciation each year for the subsequent purchase of shovels so that the enterprise does not experience a depreciation shortfall as it did in example B which used the historic cost basis. Because of this the eight percent return on book value, which is now \$2.20 per year, beginning in year two, is "protected." Notice, also, that in the example the real values have all been maintained through the use of current cost values in the face of the inflationary price increase. Prior to the

onset of the price increase, the enterprise required a return of \$2.00 per year. Under the approach of example C, with current cost values, the enterprise receives \$2.20 per year, which is equivalent to the former \$2.00 after the effect of the ten percent inflation has been removed.

The net returns from Schedule V (shown as "8% Return" in each case), have been summarized in Table I. The comparison of the returns in each of the three examples has been shown in nominal dollars (i.e., current dollars of that year) and real dollars (equivalent to the dollar values of January 1 of Year 1). As is evident from a comparison of columns (3) and (4) of that table, the effect of the decline in the purchasing power of the net income derived from the rental of shovels is to deteriorate those returns which were calculated on the basis of historic cost values after the price increase. Notice that neither example A nor example C is affected by the relationship between nominal and real values. Example A is not affected because of the absence of any inflation in this case; example C is not affected because all calculations were derived from current values which incorporate the impact of inflation. With respect to



TABLE I

Comparison of Real and Nominal Net Returns to Book Values --  
Under Different Asset Valuation and Inflation Conditions

	A: Stable Price - Historic		B: Rise Price - Historic		C: Rise Price - Current	
	(1) Nominal	(2) Real	(3) Nominal	(4) Real	(5) Nominal	(6) Real
Year 1	\$2.00 8.00%	\$2.00 8.00%	\$2.00 8.00%	\$2.00 8.00%	\$2.00 8.00%	\$2.00 8.00%
Year 2	\$2.00 8.00%	\$2.00 8.00%	\$2.08 8.00%	\$1.89 7.59%	\$2.20 8.00%	\$2.00 8.00%
Year 3	\$2.00 8.00%	\$2.00 8.00%	\$2.14 8.00%	\$1.95 7.80%	\$2.20 8.00%	\$2.00 8.00%
Year 4	\$2.00 8.00%	\$2.00 8.00%	\$2.18 8.00%	\$1.98 7.92%	\$2.20 8.00%	\$2.00 8.00%
Year 5	\$2.00 8.00%	\$2.00 8.00%	\$2.20 8.00%	\$2.00 8.00%	\$2.20 8.00%	\$2.00 8.00%
Year 6	\$2.00 8.00%	\$2.00 8.00%	\$2.20 8.00%	\$2.00 8.00%	\$2.20 8.00%	\$2.00 8.00%

Source: Schedule V.

example B, the railways explained the cause of the changes  
as follows:

since the nominal cost of funds component is a constant fraction of the historical cost asset base, it grows at a rate which is less than the rate of inflation; (in Year 2) the price level rises by 10% but the cost of funds component rises by only 4%. The result is a decline in

the real value of the cost of funds component, i.e., the provision for cost of funds in dollars of fixed earning power. The severity of this initial decline is a function of asset life. Here, since 40% of net assets are replaced, the nominal cost of funds component grows by 40% of the inflation rate."\*

If we continue with the examination of Schedule V, the impact of the "one-shot" price increase and the resulting market "correction" can be seen more fully. The "Valuation Base" is the net book value of the assets, shown at January 1 of each year, and will constitute the rate base on which the 8 percent return will be calculated. "Depreciation Funds" is the sum of the depreciation allocation for that year and is derived from the straight-line depreciation rate applied to the gross book value (historic or current, depending on the assumption used). As indicated by the arrow, these funds immediately become available for reinvestment in the purchase of the new shovel, as required each year. In example A, with no inflation, the source of these funds and their application are equal and the level of capacity is perpetuated with no excess or deficiency of funds. This is also true in the third example, since the revaluation of the gross book

---

\* Exhibit R-4, p. 13.

value at December 31, at the same instant that the prices increase, will cause the Year 1 depreciation funds to be \$11.00, equal to the funds applied to the purchase of shovels. In subsequent years, the current value of the assets (all valued "as if" purchased at \$11.00 since that is their replacement cost) will generate sufficient funds for the continuation of the existing capacity. In example B, with a price increase but no change-over to current values, the funds available from Year 1 lag behind the funds required to perpetuate the capacity level of four shovels. As a result, there is a depreciation shortfall in Year 2 which, if the company is to retain its present capacity, must be forthcoming from one of three sources:

- retained earnings, decreasing funds available for distribution as dividends;
- new equity issues; and/or
- debt financing.

The impact of the use of each of these will be examined later. The shortfall in Year 3 is somewhat less, since the gross book value is expanding with the addition of higher priced shovels. By Year 6, the shortfall has disappeared with the depreciation from Year 5, based on all shovels purchased at the higher price, sufficient to purchase the new shovel.

The return, which has been provided in the rental charge, is calculated as 8 percent of the valuation base (line 1). This is equivalent to a capital funds rate and represents payment for the provision of the investment dollars represented by the "Valuation Base." The values of the "8% Return" line are summarized in columns (1), (3), and (5) of Table I. The "Year End Values of Investment" are the Jan. 1 net book values repeated -- prior to deducting depreciation and adding the new shovel. The sum of these latter two components is the "Investor Funds" and represents the total dollars related to this enterprise which are "available" to the investor. That is, at the end of the year, as owner of the enterprise, he has title to those dollars. If this company were financed totally by equity, this amount would represent the sum of funds available for distribution as dividends plus the closing price of the stock for that year.

The question which arises from these data is: What is the dollar value of funds which someone would be prepared to supply in order to receive these "Investor Funds?" The answer to this is the present value (at January 1 of each year) of the "Investor Funds," where the present value is found by discounting the "Investor Funds" by a rate which accounts for inflation and the time-preference of individuals (real

capital funds rate).<sup>\*</sup> This amount is shown as "Invest. Funds at Jan. 1." This can be further decomposed into "New Investment," which is the depreciation shortfall which will need to be forthcoming to maintain existing capacity, and "Existing Investment," the residual amount obtained by subtracting the latter from the former.

In example A there is no problem since the dollars that an investor is prepared to invest on January 1 of each year (line 9 below the diagram) on which he requires a return of 8 percent<sup>\*\*</sup> will be equal to the year end value of the investment (and the valuation base) of the previous year. Under these circumstances, the company will not have any problem in retaining its existing investors or attracting new investors. That is, the amount of "Existing Investment" and the amount of the previous "Year End Values of Investment" will be equivalent.

In example C, except for Year 1, where no inflation existed and Year 2, when prices rose by 10 percent, all

---

<sup>\*</sup> Such a rate which is the required nominal yield to attract and hold capital will be equal to  $[(1 + k)(1 + i) - 1]$  where 'k' is the real capital funds rate and 'i' the anticipated rate of inflation.

<sup>\*\*</sup> Since  $i = 0\%$ , then  $[(1 + i)(1 + k) - 1] = k$ , which is 8% in this example.

other years are straightforward and the company will have no difficulty attracting capital. For Year 2, the "Existing Investment" value corresponds to the valuation base of the previous year and the company will be able to keep its investors. The discounting factor for Year 2 is 18.8 percent, based on the inflation rate of 10 percent and the real rate of return requirement of 8 percent. With no inflation, Year 1 is the same as under example A.

It is only under example B, in Year 2, the year in which inflation occurred, that we observe a breakdown in the system. In Year 2, the value of existing investment (or the amount that an investor would be willing to provide to receive the "Investor Funds" available at the end of that year) would be \$23.64. However, the year-end value of investment from Year 1 is \$25.00. That is, existing investors would not be willing to leave their money "tied up" from Year 1 into Year 2 since they are being asked to provide more than they are willing, to receive the promised value at the end of Year 2. This results from the required yield of 18.8 percent for Year 2 -- a yield to offset inflation and cover the real capital funds rate requirement. As described in the railway submission:



Its practical meaning is that no equity investor would pay the nominal value of the company's assets, either as a whole or on a prorata basis ... Under these conditions, the company will be unable to attract capital.

There is no problem in subsequent years, as the income allowance and investors' required yield coincide.\*

The problem of Year 2 is corrected if the cost of funds rate is allowed to rise to 18.8 percent for that year. The results of this change are shown in Schedule V, page 2. Example D (RISING PRICES - HISTORICAL COST VALUES - NOMINAL CAPITAL FUNDS RATE). Note that with the increase in the capital funds rate the existing investors and new investors will be satisfied with their returns and the company will be able to attract and retain capital. This correction of the investors' required nominal yield when an historical cost valuation base is utilized such that the real yield obtained is equivalent to the yield which would have been obtained in the absence of inflation has been referred to as the Fisher Effect.

Before leaving this point, we illustrate the data which leads the railways to conclude that the use of historical costs - nominal capital funds, though consistent with the need to attract capital, is more costly than the current value approach

---

\* Exhibit R-4, p. 22.

To do this, we need only list the total capital costs (depreciation plus cost of funds) from page 2 of Schedule V. These are summarized in Table II which shows that the total undiscounted cost of funds over the six year period for the Historical/Nominal case is \$0.11 more than the total cost of funds for the period under the Current/Real case (\$79.11 - 79.00).

We next point out the effect of providing the required new investment from the three sources referred to earlier. This is comparable to the analysis contained in pages 15 to 18 of Exhibit R-4 which led the Provinces to rebut:

Dr. Quirin's chief, if not sole argument, in favour of determining the depreciation charge on the basis of the replacement cost of the assets consisted of tables and text (which) ...are correct in the trivial sense that they are an obvious proposition: when a firm's investment outlays exceed its depreciation charge, the additional funds must come from somewhere.\*

In general, we agree with the Provincial comment. However, we should comment that the railway presentation was designed to illustrate that the depreciation shortfall could not be offset in any manner which would

---

\* Exhibit AMS-17, p. 87.

TABLE II  
Capital Cost under Alternative Valuation Bases

Year	Historical/Nominal (Example D)			Current/Real (Example C)		
	Cost of Funds	Dep'n	Total	Cost of Funds	Dep'n	Total
Year 1	2.00	10.00	12.00	2.00	11.00	13.00
Year 2	4.89	10.25	15.14	2.20	11.00	13.20
Year 3	2.14	10.50	12.64	2.20	11.00	13.20
Year 4	2.18	10.75	12.93	2.20	11.00	13.20
Year 5	2.20	11.00	13.20	2.20	11.00	13.20
Year 6	<u>2.20</u>	<u>11.00</u>	<u>13.20</u>	<u>2.20</u>	<u>11.00</u>	<u>13.20</u>
TOTAL	15.61	63.50	79.11	13.00	66.00	79.00

Source: Schedule V, p. 2.

permit the maintenance of existing capacity when using an historical valuation base and real cost of funds rate.

To this we agree. In Example D we have shown that in Year 2, the owners of the assets (\$25) are willing to invest these for use for one year and a "new investor" will be willing to "put up" the required investment (depreciation shortfall) because the return (which includes an allowance for inflation) is adequate. The source of this

one dollar is immaterial. If it comes from the dividends of Year 1, then that would represent a logical decision on the part of the dividend recipient of Year 1. Similarly, if the funds were provided from either new debt or equity issues, the effect would remain unchanged, and each would represent a logical decision on the part of the investor. As to the fact that the issue of new stock dilutes old stock or that borrowing reduces the amount of net income available for distribution as dividends, these effects and their impacts on capital structure, capital funds rates and equity share prices are all independent of the problems introduced by inflation.

Finally, before leaving the examples of inflationary impact and market adjustments, we should comment on the compounding effect of continued price increases. In the examples of Schedule V, the market adjustment in nominal yield was only required in Year 2, because of the incidence of inflation at midnight of January 1 of that year. If inflation were to occur in Year 3, then it would be necessary for the return of that year to be adjusted to include the real yield requirement and the allowance for inflation, according to the formula of  $[(1 + i)(1 + k) - 1]$  as discussed earlier. For simplicity of exposition, we have set all of the "steps" of the analysis of Schedule V as discrete occurrences. Where

inflation occurs continuously, then the adjustment process would reflect this compounding. However, the principles of our example would remain unchanged. As illustrated in Appendix III to Exhibit R-4,

"the continuous inflation case may be viewed as the product of a succession of one-shot doses of inflation."\*

In the case where inflation is expected at a rate of 10 percent per year, and the real required return of investors was 8 percent, then an 18.8 percent nominal return every year, on an historical value base, would provide sufficient funds for the continued operation of the company at existing capacity levels. Alternatively, an 8 percent return every year, on a current value base, would also yield sufficient funds for its continued operation.

#### Discussion of Alternatives

Given this equivalence in outcomes under both historical and current cost values, the choice between the two valuation bases was undertaken in response to other criteria. In advocating the adoption of historical costs, the Provinces

---

\* Exhibit R-4, p. 83.

advanced the three criteria referred to previously:

- logical consistency with purposes of cost ascertainment
- ease of implementation
- accepted common usage

The purposes of the cost ascertainment, according to the Provinces, was to establish the investors' compensation requirements that would justify current investment and re-investment in the company. In their initial presentation to this Commission, they argued that:

The argument sometimes advanced that only replacement cost leaves a firm indifferent between providing a service and not doing so is wrong. The reason is that historical cost valuation recognizes and incorporates replacement cost insofar as it is relevant to the firm's decision.\*

In support of this, the Provinces made the following additional points:

- the common practice of using a utility's embedded (i.e., weighted historical) cost of debt rate does not deny the company access to future capi-

---

\* Exhibit AMS-2, p. 56.



tal in the capital markets. Rather, since the embedded rate is affected by current borrowing at current interest rates (in the weighting process), then the use of historical costs is both consistent and appropriate

- the investment in new equipment at current rates is not made more attractive nor less attractive through the use of historic or current values on existing assets
- "if historical cost were adopted as the basis of valuation when the railway was established, its use would be consistent with the goal of having the railway make the investments over time that are required to provide service."\*
- "if replacement cost were expected to rise over time in relation to historical cost, investors would require a lower rate of return than they would require under historical cost."\*\*
- switching from historical to current costs as the valuation base should not be made retroactively, since the incorporation of "the ex post difference between replacement and historical cost in the rate base provides the company with a windfall gain or loss. It serves no economic purpose."\*\*\*

---

\* Ibid., p. 58.

\*\* Ibid.

\*\*\* Ibid. Interestingly, the Provinces do not claim that switching to current costs would be categorically wrong, but comment that if the change were made "for some reason, the change should not be made retroactively... Only the rise or fall in replacement cost relative to historical cost subsequent to the decision should be incorporated in the rate base." This is comparable to the "hybrid" proposal of the railways.

- the question of depreciation can be answered in a like manner, so that even where replacement of existing capacity exceeds the funds obtainable from historical depreciation, the company is still satisfied to replace the capacity if it is earning its cost of capital, since the replacement is a prospective investment decision, as discussed above, and the return will be on the historic value of the investment (which is undertaken in "current" dollars).

In reference to the above points and the two examples which were offered in support of these, the Provinces concluded:

It has just been shown that both historical cost and replacement cost valuation are consistent with the purpose for which we want to assign a cost to a company's assets.\*

When examining the ease of implementation, their second criterion, the Provinces state:

There is considerable testimony on the difficulty of implementing replacement cost valuation for companies such as railroads.\*\*

In support of this, they refer to a statement made over 35 years ago, "when replacement or reproduction cost was more

---

\* Ibid., p. 59.

\*\* Ibid., p. 55.

widely used,"\* concluding that the difficulties cited in the quotation "undoubtedly played a large role in the widespread adoption of historical cost and the abandonment of replacement cost in regulatory practice."\*\* In spite of the difficulties and costs of implementing a replacement cost procedure, the Provinces accepted that such a procedure was possible but that it was less desirable.

Finally, the Provinces argued that in North American regulatory jurisdictions there was almost universal adoption of historical costs "in the regulatory determination of the revenues required to cover capital cost."\*\*\* Noting that only the State of Ohio used replacement cost for

---

\* The referenced statement in Exhibit AMS-2, p. 55, is by Ben W. Lewis, in L. S. Lyon and V. Abramson, Government and Economic Life, (Washington: The Brookings Institution, 1940), as quoted by Alfred E. Kahn in The Economics of Regulation, (New York: Wiley, 1970) Vol. 1, p. 39:

"It is not too much to say that in terms of cost, delay, uncertainty, and the arousing of animosity and contention, the performance of the reproduction cost method falls little short of a public scandal; by far the greater part of the grotesque and costly ponderosity which characterizes modern rate regulation is to be attributed directly and solely to the reproduction cost approach."

\*\* Exhibit AMS-2, p. 56.

\*\*\* Ibid., p. 54.

regulatory purposes, the Provinces concluded: "Therefore, the test of usage clearly argues in favor of historical cost asset valuation."\*

During cross-examination, two exhibits were introduced by the railways dealing with the second and third of the Provinces' criteria. One of these\*\* was a reproduction of selected pages of the NARUC 1974 Annual Report, which provides selective legislative information concerning the practices and procedures in some 58 jurisdictions in the United States. When first introduced, the railways questioned whether this didn't indicate that more jurisdictions than Ohio utilized some information about replacement or reproduction costs. However, further testimony and the rebuttal submission of the Provinces seemed to indicate that the use of historical cost was, in fact, "practically universal."\*\*\* In their summary statement, the railways seem to further dissolve this issue with the paragraph:

---

\* Ibid., p. 54.

\*\* Exhibit R-15; pp. 388-395 and cover of 1974 Annual Report on Utility and Carrier Regulation, National Association of Regulatory Utility Commissioners.

\*\*\* Exhibit AMS-2, p. 54. In fact, some indication was given that even Ohio was contemplating the discontinuance of replacement costs as the rate base; see Transcript, Vol. 12, pp. 2166 and 2167.

Nor, it is submitted, is current regulatory practice in the U.S. a valid guide in this proceeding, not only because this is not a regulatory proceeding (Tr. 6827-8), but because the current state of the regulated industries in the U.S., which reflects that practice, is hardly an example to be emulated. (Tr. 5389-91, 5445)\*

The second exhibit\*\* was a copy of several notices of the Securities and Exchange Commission, Washington, D.C. regarding amendments to Regulation S-X requiring disclosure of certain replacement cost data in notes to financial statements. The material in the document, which deals with replacement costs, at first came "as a great surprise" to Dr. Gordon.\*\*\* However, he noted that, as yet, there was no experience with regard to the nature of the compliance with the Order and that there was a big distinction between development of these data for reporting purposes such as were contemplated by these regulations and the development of these data for determination of price in a regulatory context. In rebuttal, Dr. Gordon noted that the United States Federal Register (March 31, 1976, page 13-626) contained amendments to this Regulation S-X which freed companies from legal liability for misrepresentation of the replacement cost

---

\* Summary and Final Argument of Canadian National and CP Rail, Cost of Capital Section, p. 32.

\*\* Exhibit R-9.

\*\*\* Transcript, Vol. 12, p. 2150.



of assets, because of "the imprecise nature of replacement cost information."\*

While dealing with this document, we wish to note further several passages contained therein:

In requiring these data, the [Securities and Exchange] Commission is aware that it is requiring companies to make disclosures of costs which cannot be calculated with precision. They must be estimated on the basis of numerous assumptions which may vary over time and from company to company and through the use of techniques which are not so fully developed that they can be standardized at the present time, if ever. This is because estimates of current replacement cost must be made within the framework of each registrant's economic situation and because there are difficult conceptual and empirical judgments which must be made in the light of different specific factual circumstances in developing the data. Nevertheless, the Commission believes that such data are important and useful to investors and are not otherwise obtainable. It feels that imprecision, if properly explained, will not make the data misleading. The Commission encourages registrants to supplement the required disclosures with information which management believes will be helpful to investors in understanding the impact of price changes and other current economic conditions on reported results...

... the rule covers new ground and requires subjective judgments in its application ...

... This may include a discussion of possible favorable effects of inflation on the firm, such as the benefits from repaying debt in less valuable dollars and the possible benefits of operating leverage in an inflationary environment.

---

\* Quoted in Exhibit AMS-17, pp. 86 and 87 and in Transcript, Vol. 13, pp. 2445-2447.



While certain standards and guidelines for application of this rule may be developed after experimentation has taken place, it is highly unlikely that a totally uniform set of procedures can ever be developed which will make the implementation of the rule a mechanical process.\*

The railways, in their initial submission, concluded that the objective of this cost ascertainment procedure was the determination of long-run economic costs and that, to be consistent with this, current value should be the basis on which depreciation is calculated -- since historical cost depreciation may not be consistent with the definition of long-run costs which "define the minimum level of revenue required to maintain output indefinitely... This is true regardless of what method is employed in determining the cost of funds component."\*\* Further, they argued:

If possible, the current value/real rate combination should be chosen, because it is cheaper, because it produces better matching of costs against output, and because it most closely resembles long-run economic costs.\*\*\*

For these reasons, they concluded that the ideal calculation of the cost of capital would be based on current

---

\* Exhibit R-9, pp. 2, 3, and 4, emphasis added.

\*\* Exhibit R-4, p. 50.

\*\*\* Ibid., p. 52.

value depreciation, a current value asset base and a real cost of equity rate.

Their conclusion that the current value/real rate was cheaper was based on the fact that the use of current value avoids inclusion of an allowance for the risk of the estimate of future inflation. Under the historical cost case, investors include an allowance for the possibility that the anticipated rate of inflation may be incorrect, and this allowance makes that basis relatively more costly. In support of this, they referred to the article written by Dr. Gordon: "Comparison of Historical Cost and General Price Level Adjusted Cost Rate Base Regulation" in which he noted:

The consumer is better off under price level adjusted rate base regulation than under historical cost regulation

and

uncertain inflation with historical cost regulation increases risk to both the investor and the consumer with the full burden of the increased risk falling solely on the consumer\*

In defense of this article and its finding, the Provinces argued:

---

\* Exhibit AMS-12, p.2.

The conclusions with regard to the consequences of GPLAC rate base regulation in the above paper were reached under very brave assumptions and represent the first analysis of the problem that has been undertaken. It is therefore premature to implement the policy recommendations implicit in the paper at the present time, particularly with the existing practice functioning adequately.\*

The railways further argued that, under historic costs, depreciation charges grow with a lag to price increase and costs are recovered doubly as investors are compensated for losses in the purchasing power of their income stream and are paid a return on the enlarged nominal asset base as assets are replaced:

In effect, under historical cost, they (consumers) pay to avoid the effects of inflation, but ultimately must bear them anyway, thereby paying twice.\*\*

In testimony presented by Dr. Quirin and Dr. Waters to the Ontario Energy Board on a Fair Rate of Return for Union Gas Limited, February 1974 and cited by the Commissioner

---

\* Exhibit AMS-17, pp. 89 and 90. The "very brave assumptions" were essentially that assets had an infinite life and depreciation was not an element of cost.

\*\* Exhibit R-4, p. 26. The arithmetic examples which illustrate this were presented in the earlier part of this section (See Table II).

during these hearings,\* in a section of that testimony entitled "The Need for an Inflation Adjustment," Dr. Quirin stated:

What the argument overlooks, (the argument for trended costs) in our view, is the effectiveness of the pricing mechanism in the capital market. Similar problems are faced by bondholders in all types of companies, not merely utilities, and by holders of government bonds. Their capital is returned in dollars which have lost a substantial fraction of their value, while the annual interest payment they receive is similarly fixed, more rigidly so in fact than the return which accrues to utility stockholders. In view of the expectations of continuing inflation which have pervaded this continent for most of the last twenty years, how have corporations and governments been able to continue to sell bonds? The answer is simply that yields have risen ... the higher 'interest' payments which result include what amounts to a partial amortization of the original investment, and, at least in the case of issues which are held by individuals, an implicit allowance for the fact that the partial 'amortization' payments are taxable as income. No 'protection' is required for the bondholder, because he has adjusted the terms on which he is willing to lend money to protect himself against inflation. It is quite true that there are bondholders on whom the risk of price level change has fallen adversely... The fact that a loss emerges as the consequence of a risk freely accepted does not, however, demonstrate that the premium paid for the acceptance of the risk at the time the contract was made was inadequate. It demonstrates merely that risks sometimes come home to roost... Bondholders as well as utility stockholders have suffered losses in real wealth as a consequence of unexpected inflation. We see no reason why the latter should be singled

---

\* Transcript, Vol. 36, pp. 7013-7021.

out for compensation, given that the risk was freely accepted by both ... What is at issue in the choice of an original cost or trended cost rate base is the question of who will bear the risks arising from inflation? ... As long as it exists it must be borne by someone. With a trended cost rate base it is borne by the consumers; with an original cost rate base it is borne initially by the shareholders ... But if the utility is to continue to attract capital, rates of return will reflect the risk borne so the consumer must pay in either case. ... The possibility of saving the risk premium which will be associated with shares subject to original cost regulation as a consequence of the inflation risk is the only basis on which the application of a trended cost rate base or similar adjustments should in our view be undertaken. In the present context, a switch would create an immediate, totally unwarranted windfall for shareholders. There might be ultimate savings to consumers, but they will be long-postponed.\*

In responding to this, Dr. Quirin suggested that, since undertaking that testimony, he had revised his conclusions and felt that there were other savings caused by the way the system happens to work. In response to the Commissioner's question, the following answer was given:

THE COMMISSIONER: Then, Dr. Quirin, if it makes no difference and no inequity results, why would one shift from an original cost basis to a trended cost or inflation cost basis?

DR. QUIRIN: It does not make a difference in the ability of the company to attract capital which is I think the discussion there.\*\*

---

\* Ibid., pp. 7013-7019.

\*\* Ibid., pp. 7020-7021.

This conclusion is clearly supported by the Provincial submission:

It also has not been shown that the capital markets will not provide the funds or that investors are being unfairly treated if the responsibility is left with the capital markets.\*

Because of the problems of determining a real cost of equity rate and because of the possibility of "windfall" profits resulting from implementation of the current value asset base and a real cost of equity rate, the railways recommended:

For the time being, therefore, it is suggested that the cost of funds component be computed using historical costs and the nominal cost of funds.\*\*

For the future, they recommended a gradual change to the current value basis of determining the capital funds component:

It is therefore proposed that provision be made for the incorporation of price level changes subsequent to December 31, 1974 into the valuation base for purposes of determining future adjustments in costs; market prices and yields should adjust to this modified basis of computing revenue requirements by the time revenue adjustments become necessary. Any discrepancy between current values and historical costs as

---

\* Exhibit AMS-17, p. 89.

\*\* Exhibit R-4, p. 54.



of December 31, 1974 would simply be ignored for purposes of calculating the cost-of-funds component. As present assets were retired, the valuation base would gradually be converted into a full current value base.\*

## Conclusion

The issue of replacement cost vs. original cost has been around for a considerable time now, and it appears to be swinging full circle. As stated in Volume I of the Report,\*\* this Commission adopted the use of original cost values in determining capital costs of transporting grain by rail, because of: the problems inherent in determining a current value asset base and a real cost of funds rate; the lack of justification for shifting the risk of unanticipated inflation from the investor to the consumer; the complications induced by existing income tax laws; and the fact that for 1974, the base year of our examination, the capital funds cost would be the same under both procedures.\*\*\* This latter point and its relationship to the position of the railways is confirmed in the following exchange between Dr. Gordon and Dr. Quirin:

---

\* Ibid., pp. 54 and 55, emphasis added.

\*\* Report, Volume I, The Commission on the Costs of Transporting Grain by Rail, pp. 75 and 76.

\*\*\* The railways' proposed "hybrid" solution would result in only depreciation being computed on a current value base for year 1974.

DR. GORDON: So therefore your proposal has relevance only for the determination of capital costs in periods subsequent to the period in which it is adopted?

DR. QUIRIN: Yes

DR. GORDON: And the Commission might take advantage of the proposal as a recommendation to be made to commissions that determine costs in the future?

DR. QUIRIN: Yes\*

As well, the final paragraph of the railway summary submission, on the topic of Valuation of Assets, makes the same request:

It is on these grounds that the railways submit that you should include a finding that a current value valuation base, as proposed in Ex. R-4, should be adopted for the future.\*\*

For the reasons cited previously, we did not adopt the use of current values for our cost determinations for the year 1974. By the same reasoning we have not found any compelling reason to recommend the adoption of this approach for future costing of grain transportation.

---

\* Transcript, Vol. 34, p. 6586.

\*\* Summary and Final Argument of Canadian National and CP Rail, Cost of Capital Section, p. 33, emphasis added.

## CHAPTER IV

### RISK OF GRAIN TRANSPORTATION

The risk of anticipated and unanticipated inflationary price increases was one of the principal factors bearing on the choice of asset base valuations as discussed in the previous chapter. In addition to this risk, the corporation and the investors in the corporation confront other risk factors and influences which affect the capital funds cost. This chapter deals with the relative risk levels of grain transportation when compared to the transportation of other commodities by rail, when compared to the nonrailway activities of CP Ltd. and when compared to other companies in which the investors of CP Ltd. could alternatively place their funds. The impact of riskiness and risk-bearing ability on the relative proportions of debt and equity in the capital structure appropriate to the costing of grain transportation by rail, and on an appropriate cost of funds rate for common equity, are discussed in subsequent chapters.

#### Risk Categorization

Though there is an overall "risk" that can be attached to virtually every activity and enterprise, this composite effect can normally be decomposed into identifiable risk elements. In the case of a corporation, the company and its shareholders have a total risk which can be separated into

business risk and financial risk. The two are not independent but are multiplicative.

Business risk can generally be defined as the probability that the actual accounting results of a firm's operations will differ from the investor's expectations of those results. Business risk is partly affected by external and partly by internal factors. It arises from the nature of the company's operation, its pricing and revenue activities, and the market in which it operates. It is independent of the method (debt or equity) of financing, though it may be affected by the absolute or relative amount of financing. The possibility that the company could default on all or part of its obligations for interest payments and repayment of principal and any uncertainty about the timing of these payments will result in a business risk.

The financial risk arises from the method of financing investments which is chosen by the corporation. It refers to the relative proportions of debt and equity (the degree of leverage) in the capital structure of the corporation. The use of debt or preferred shares in financing introduces a factor of variability in the net earnings and affects the possibility of bankruptcy, thereby influencing the risk of holding or providing equity capital to the corporation.

These two approaches to the explanation of risk were incorporated in the analysis of the participants before this Commission. However, no attempt was made to measure these risk factors separately. Instead, the Provinces and railways undertook several other approaches designed to measure the combined effects of these risk factors.

### Systematic Risk

In their initial submission, the Provinces argued:

the risk of an asset from the viewpoint of an investor does not depend simply on the variability of its return. Rather, the risk depends on the covariance of the return with the return on a diversified portfolio of assets.\*

This view of risk is consistent with portfolio theory developed in recent years and relies on the analysis of the variability of returns in two component parts. Previously, risk was usually measured by the variability of realized returns on the funds invested in a company. This variability, commonly measured as the statistical variance of

---

\* Exhibit AMS-2, pp. 63 and 64. A footnote to this section refers the reader to numerous articles in the Journal of Finance, the Financial Analysts Journal, and other theoretical and applied journals which developed and analyzed this reasoning.

returns about some mean or trend, relied on past variability being representative of future variability. The logic was that a company which had exhibited past variability of returns introduced a degree of uncertainty into future expectations of returns.

As enunciated by the Provinces, more recent portfolio theory holds that part of the variance of the returns is due to, or identifiable with, general market conditions. These conditions exist externally to the firm; they reflect general business cycle conditions, political and climatic conditions, and impact on the fortunes (and returns) of all firms -- to a greater or lesser degree. The other part of the variance of returns is peculiar to the abilities and policies of each company. This unique risk is generally independent of the general market movements and is clearly independent of the peculiar risks of all other companies. This latter part of the variance of returns is usually referred to as diversifiable or unsystematic risk, while the former, market-related variance is referred to as non-diversifiable or systematic risk. The importance of this decomposition is that as long as the diversifiable risks of different firms are uncorrelated, then an investor can avoid this risk by maintaining a sufficiently large (and hence diversified) portfolio. In effect, the unsystematic risks of



all the other companies offset the unique risk of a single firm so that the net risk becomes zero. This is essentially the perfectly competitive capital markets (PCCM) model. The exact number of stocks which are required in the portfolio is not particularly critical to the analysis of the Provinces though the submission refers to one source \* which supports the contention that:

... the importance of unique risk is rapidly reduced, even with very few securities in the portfolio. Given this phenomena and the dominance of medium and large investors in the marketplace, almost all professionals believe that it is the presence of nondiversifiable risk that causes investors to demand a higher return and unique risk has very little impact on the rate of return investors require for holding a security.\*\*

The market-related systematic risk is measured by the Beta coefficient (B).\*\*\* This measures the sensitivity or susceptibility of the returns of a single security to movements in the returns of all securities (or of the returns

---

\* Elton and Gruber, International Capital Markets, North Holland Publishing Company, 1975.

\*\* Exhibit AMS-17, p. 149.

\*\*\* Statistically, for the return 'Ri' of a particular firm 'i' and the return 'Rp' of the market portfolio,  

$$B_i = \frac{\text{Cov}(R_i, R_p)}{\text{Var}(R_p)} \text{ and} \quad (\text{Eq. 1})$$

$\text{Var}(R_i) = B_i^2 \text{Var}(R_p) + \text{Var}(u_i)$  where 'Var (Ri)' is the expected variance of the return 'Ri' and Var (ui) is the unique part of the variance of the return of firm 'i'. Note that a diversified portfolio is predicted to remove the individual effect of 'Var (ui)'.

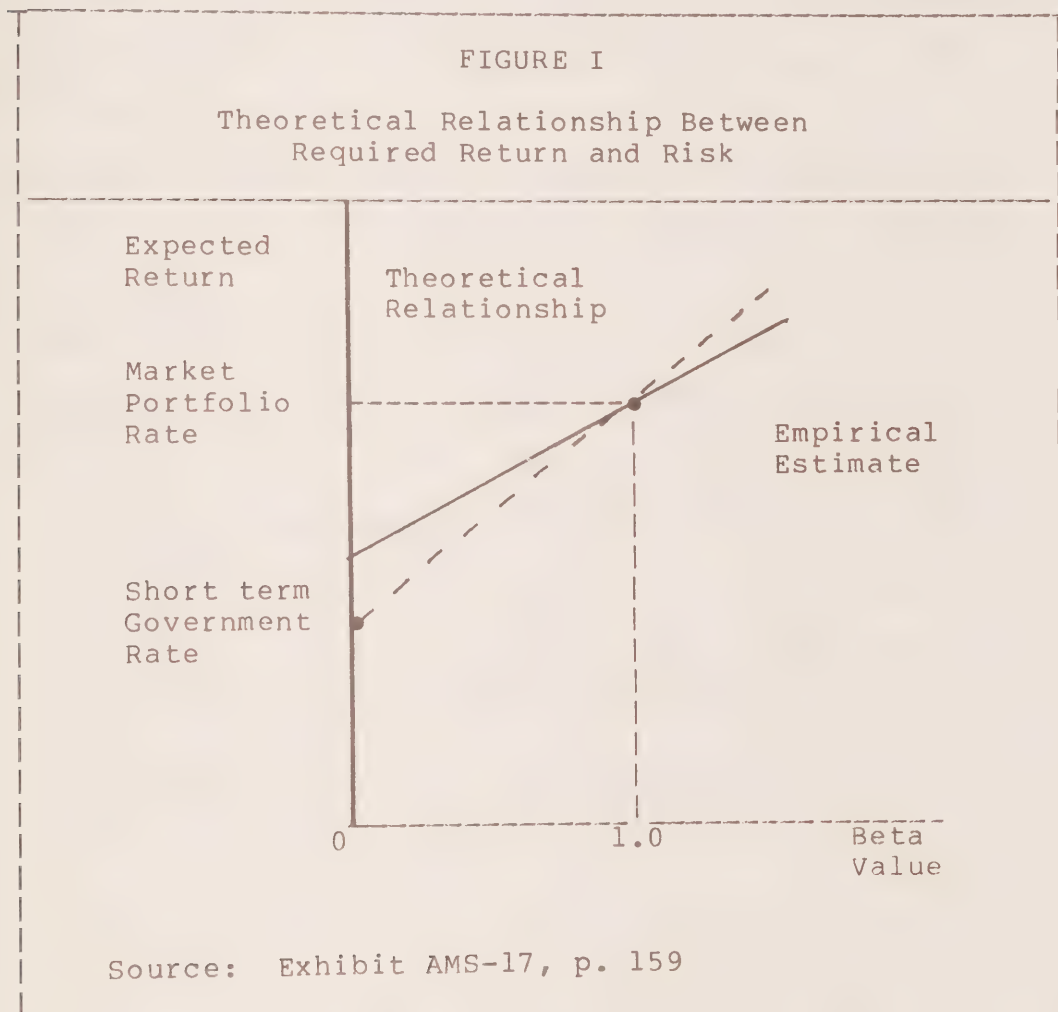
of securities in a diversified portfolio). Though Beta may take on a range of numerical values the pivotal values of Beta are zero and one. At one, the Beta value implies that the nondiversifiable variance of the returns of a particular company are perfectly correlated with the returns of the market portfolio, such that a one percent decrease in the return of the market portfolio will be accompanied by a one percent decrease in the return of the company under analysis. A Beta of less than one for a particular company indicates that its returns are less variable than those of the market. A Beta value of zero means that if the market return increased or decreased by any amount over time, it would not result or be reflected in any systematic change in the returns of the individual company. According to the Provincial submission, Beta may be determined as the slope coefficient of a regression of expected returns on a stock against the differential of the expected return on the market portfolio over the return on short-term government bonds. Using the same notation as before (footnote\*\*\* previous page)

$$R_i = R_f + B_i (R_p - R_f) \quad (\text{Eq. 2})$$

where ' $R_f$ ' represents the return on an investment in a risk-free asset whose returns are certain--such as a short-term government bond. On the topic of the relationship between required return and risk, they said:

it is linear and if Beta measures risk, then the straight line passes through the return on a government bond (Beta = 0) and the return on a market index (Beta = 1).\*

Diagrammatically, this theoretical relationship may be represented as shown in Figure I. Current evidence



\* Exhibit AMS-17, page 150. A footnote to this page refers to the empirical evidence which finds the fitted regression line slightly above the government bond rate at Beta = 0. A further review of research in this area may be found in Jensen, M.C., "Capital Markets: Theory and Evidence," Bell Journal of Economics and Management Science, Autumn, 1972, pp. 357-398.

seems to suggest that, depending on the estimated value of Beta, the empirical estimate may over- or underestimate the true theoretical relationship.

The rebuttal of the railways on the use of Beta for the assessment of risk was quite detailed. Citing one 1972 review,<sup>\*</sup> the railways observed:

Evidence employing Beta coefficients has been presented in a number of proceedings..., but commissions have generally preferred to rely on more conventional approaches.\*\*

Further, they argued that the theory was being used to develop inferences about an individual security and that many of the tests of the hypothesis, cited by the Provinces, were for portfolios and were irrelevant. One reference cited by the railways in both their cross-examination of Dr. Gordon and their rebuttal testimony found that only 36 percent of the variation of subsequent period Betas for an individual security could be explained on the basis of prior period Betas, leading the author to state:

---

<sup>\*</sup> Myers, S.C., "The Application of Finance Theory to Public Utility Rate Cases," Bell Journal of Economics and Management Science, Spring 1972, pp. 58-97.

<sup>\*\*</sup> Exhibit R-30, p. 8.

The large magnitude of unexplained variation may make the beta coefficient an inadequate measure of risk for analyzing the cost of equity for an individual firm.\*

Citing a considerable number of additional references,\*\* the railways argued that sufficient evidence and empirical findings exist to suggest that either the PCCM theory or the alternative, which includes other factors of risk, can be argued as appropriate; but neither can be conclusively accepted. Finally, three references\*\*\* to the efficacy of using Betas were summarized by the railways, with the truncated quotation:

---

\* Blume, Marshall E., "On the Assessment of Risk," Journal of Finance, March, 1971, p. 7; (also, as Exhibit R-21).

\*\* Douglas, G.W., Risk in the Equity Markets, an Empirical Appraisal of Market Efficiency, Ann Arbor, University Microfilms, 1968; Lintner, J., "Security Prices, Risk, and Maximal Gains from Diversification," Journal of Finance, December 1965, pp. 587-615; Friend, I. and Blume, M., "Measurement of Portfolio Performance under Uncertainty," American Economic Review, September, 1970, pp. 561-575; Miller, M.H. and Scholes M., "Rate of Return in Relation to Risk: A Re-examination of Some Recent Findings" in M.C. Jensen (ed), Studies in the Theory of Capital Markets, N.Y., Praeger, 1972; (also, as Exhibit R-16).

\*\*\* Blume, M.E. and Friend, I., "A New Look at the Capital Asset Pricing Model," Journal of Finance, March, 1973, pp. 19-33; Breen, W.J. and Lerner, E.M., "On the Use of B in Regulatory Proceedings," Bell Journal of Economics and Management Science, Autumn, 1972, pp. 612-621; and Myers, S.C., "On the Use of B in Regulatory Proceedings: A Comment," Bell Journal of Economics and Management Science, Autumn, 1972, pp. 622-627.

the real problems in using Beta in a regulatory proceeding, ... are as follows.

First, Beta cannot be measured precisely...

Second, Beta may not be stable...

Third, the capital asset pricing model may not be the whole story about risk and return, on either a theoretical or an empirical basis. It would be foolish, given the present state of knowledge, to propose (the fundamental equation of the model) as a complete basis for regulation.\*

Unfortunately, the choice of quotation by the railways omitted the subsequent two sentences of the original paragraph:

On the other hand, the fact that the model may not be exactly true does not mean that it should be thrown away. A good case can be made for the use of Beta's as part of the evidence in regulatory proceedings.\*\*

This Commission agreed that evidence on systematic risk was both acceptable and useful in examining the appropriateness of the capital structure to be employed in the development of the cost of funds and the appropriateness of a cost of equity funds rate. However, we emphasized that this evidence needed to be both consistent with, and supportive of, other information and empirical evidence. On the issue of risk and equity return, we found sufficient evidence and persuasive argument to lead us to

---

\* Myers, S.C., op. cit., pp. 626 and 627.

\*\* Ibid., p. 627.



reject the approach taken by the Provinces in converting statistical measures of Beta into effects on the cost of funds rate. At the same time, we found the theoretical and empirical information to be useful in testing the general consistency and applicability of all other information regarding risk and cost of funds rates applicable to the transportation of grain by rail.

In agreement with the latter quotation (previous page), we used the Beta information to assist in our determinations but did not accept it as the core of our determinations.

#### Risk of CP Rail's Grain Transportation Service

Both the railways and the Provinces agreed that the risk of CP Limited, CP Rail, and CP Grain could be different\* and both agreed that where the risks differed, it would be appropriate to develop independent capital funds rates and costs. As an extension of this, both agreed that it also may be appropriate to develop a capital funds cost for a division of a company that is different from that of the parent company. However, the findings about the relative riskiness of each entity and the manner in which each party

---

\* Transcript, Vol. 10, pp. 1797-1802, Exhibit R-4, pp. 45 and 46, Exhibit AMS-17, p. 151 and Summary Argument of Canadian National and CP Rail on Cost of Capital, p. 12.

translated this into a capital funds cost differed.

Given this agreement, the next logical step in the process adopted by the Provinces would have been to obtain the market Beta statistic for CP Rail's grain transportation service -- CP Grain. However, since CP Grain is not a separate, publicly traded company, the lack of stock market information precludes the calculation of a separate market Beta statistic for the grain traffic alone.\* Confronted with this, the Provincial analysts turned to the development of a suitable surrogate. Here the Provinces referred to "a great deal of literature"\*\* which addressed the question of the relationship between "fundamental

---

\* For these same reasons, a separate market Beta statistic cannot be developed for CP Rail.

\*\* Ball and Brown, "Portfolio Theory and Accounting," Journal of Accounting Research, Autumn, 1969, pp. 300-323; Beaver, Kettler and Scholes, "The Association Between Market Determined and Accounting Determined Risk Measures," The Accounting Review, October, 1970, pp. 654-82; Gonedes, N.J., "Evidence on the Information Content of Accounting Numbers: Accounting-Based and Market-Based Estimates of Systematic Risk," Journal of Financial and Quantitative Analysis, June, 1973, pp. 407-443, (also as Exhibit R-59); Thompson, D., "Sources of Systematic Risk in Common Stocks," Journal of Business, April, 1976, pp. 73-88; and Gordon, Myron and Halpern, Paul, "Cost of Capital for a Division of a Firm," Journal of Finance, September 1974, pp. 1153-1163, (also, as Exhibit R-17).

characteristics of a traded company" and its stock market or security Beta statistic:

In almost all of the empirical research, the variable which shows a strong association with stock price Beta is the so-called earnings Beta.\*

This earnings Beta quantifies the relationship of a company's earnings with those of all companies in the economy, and rests on the strength of the relationship between a company's stock price and its earnings and the corresponding relationship between returns to a market portfolio and their earnings.

A look at the market Beta statistics for CP Limited and several companies in which they have substantial holdings shows that they are centered about 1.0 (see Table III). These results led the Provincial analysts to conclude:

their business fortunes are highly correlated with each other and business in general. However, the CP Rail's grain traffic depends on the grain crop in the area it serves, and it is reasonable to believe that the crop farmers' (sic) plant and harvest is independent of business conditions. Therefore, it is hard to believe that its Beta could be much, if at all, above zero.\*\*

---

\* Exhibit AMS-17, p. 150.

\*\* Exhibit AMS-2, p. 65.

TABLE III

Market Beta Statistics Based on Holding Period Return  
from January 1964 Through December 1975  
for CP Limited and Companies in Which  
They Have a Substantial Interest

Company	Beta		Correlation Squared
	Estimate	Standard Deviation	
CP Limited	1.10	.15	.53
Algoma Steel	.65	.20	.18
Cominco	1.05	.18	.44
Great Lakes Paper	1.38	.22	.45

Note: Beta is the regression coefficient obtained by regressing the holding period return on each stock on the Toronto Stock Exchange Index expressed as a holding period return. The holding period return is measured by quarterly change in price divided by initial price.

Source: Exhibit AMS-2, page AMS-P7.1.

To test this hypothesis, the Provinces took the percentage change in net income (to common) for Algoma Steel, Cominco and Great Lakes Paper and regressed these against the corresponding figures for all industrial corporations, to obtain a Beta-type statistic based on earnings growth. These results are included in Table IV, from

TABLE IV

Earnings Beta Type Statistics for Certain Companies  
in Which CP Limited Have a Substantial Interest

Company	Beta		Correlation Squared
	Value	Standard Error	
Algoma Steel	1.18	.85	.08
Cominco	1.67	.49	.35
Great Lakes Paper	2.91	1.08	.25

Note: All data is based on annual figures for 1950-1974. For Algoma Steel, Cominco and Great Lakes Paper, income to common after taxes was used. In every case, the regression is on net income to common after taxes for all industrial corporations.

Source: Exhibit AMS-2, page AMS-P7.2. Data based on Statistics Canada 61-003 (reproduced in AMS-2 at page AMS-P7.3).

which the provincial experts concluded:

It is clear that these companies all have high earnings growth Betas. When all corporations do well, these corporations tend to do very well, and vice versa.\*

\*

Ibid., p. 66.

When the same statistic was calculated for CP Rail,<sup>\*</sup> its resultant earnings Beta of 0.64 was substantially below those of each of the three other companies. For CP Grain a Beta-type statistic was computed on volume<sup>\*\*</sup> and was found to be - 0.24 (See Table V, p. 83) with a large standard error, indicating that it was not significantly different from zero. The Provinces concluded "(t)he CP Rail grain traffic has no systematic risk,"<sup>\*\*\*</sup> and that:

... CP Rail's income from traffic other than grain fluctuates with corporate profits, but with a smaller amplitude. CP Limited income from other operations..., fluctuates with

---

<sup>\*</sup> The complete series of CP Rail's net income from rail operations after fixed charges and taxes was not available back through 1950, so the rail earnings after taxes, but before fixed charges, was used. It was expected that the use of the earnings after taxes and fixed charges would have produced a Beta that was somewhat higher -- "but not materially so." Exhibit AMS-2, p. 66.

<sup>\*\*</sup> Grain shipments, measured in tons, was expected to be highly correlated with net income from grain shipments, since the tariff rate was unchanged through the entire period. To the extent that costs fluctuate from year to year with business conditions, then net income from grain would be expected to be inversely correlated with all other corporate profits.

<sup>\*\*\*</sup> Ibid.



the income of all corporations, and with a greater amplitude in many cases. Finally, income from grain traffic is quite independent of income from business in general.\*

On the basis of this finding of relatively low risk, the Provinces argued for a substantially lower fraction of common equity in the proposed "CP Grain" structure than was to be found in the capital structures of either CP Rail or CP Limited (a discussion of this argument is contained in the next chapter). Also, on the basis of this analysis of risk, the Provinces adjusted their calculated cost of equity capital for CP Grain. That is, the lower risk (measured by the Beta-type statistic) for CP Grain, when compared to the publicly traded CP Limited, dictates that the equity funds rate appropriate for CP Grain should be somewhat lower than that of CP Limited.

The railways had no fundamental disagreement with this approach:

If it (rail) were less (more) risky, a lower (higher) cost rate might be justified; a lower rate might also be justified if rail earnings were uncorrelated with non-rail earnings and contributed to a reduction in the riskiness of the combined operation via a diversification effect.\*\*

---

\* Ibid., pp. 66 and 67.

\*\* Exhibit R-4, p. 45.

However, based on their examination of the variability of income from rail and nonrail operations they concluded:

the hypothesis that rail operations are lower in risk than non-rail operations, or that they contribute to a reduction in the riskiness of consolidated operations, must be rejected.\*

In their rebuttal submission, the railways argued that the only evidence submitted by the Provinces to support the relationship between the market or security Beta and the earnings Beta (the Beta-type statistic based on the variance of net earnings) was the data for the three CP Limited subsidiaries included in Tables III and IV. The railways argued that this information led to the following implied (though statistically weak) relationship:

$$\text{Beta}_{\text{market}} = 0.710 + 0.164 \text{ Beta}_{\text{earnings}} \quad (\text{Eq. 3})$$

In other words, though directly related, the market Beta could not be accepted as directly proportional to the earnings Beta. The implication of this, as interpreted by the railways, was that the comparisons of Table III and the Beta statistics for CP Rail and CP Grain (See Table V, p. 83) could not be accepted without some alteration. Whereas the Provinces had used earnings Betas directly, without adjustment,

---

\* Ibid., p. 46.

as estimates of market Betas, the railways argued that their computed relationship should be used for adjusting earnings to market Beta statistics. The railways added the 0.640 earnings Beta for CP Rail to the 0.710 from equation 3, p. 80 to estimate a market Beta for CP Rail of 1.35 and concluded:

This is approximately equivalent to the observed market beta of 1.10 for CP Ltd., supporting my conclusion (R4, p.R-4-46) that CP Rail was indistinguishable in risk from CP Ltd. Applied to the 'earnings beta' inferred for CP Grain it would yield an estimated market beta for the latter of 0.47, and not the value of zero used by Dr. Gordon.\*

However, the railways' expert concurred with Dr. Gordon that "I would never draw a conclusion that two variables are related on the basis of three observations."\* In support of this, the railways referred to the earnings Beta values of Great Lakes Paper as dependent on a single atypical observation (See Schedule VI which contains reproductions of Exhibits R-23, R-24 on page 1, and R-25 on page 2) and the values of Cominco as dependent on two observations (See Schedule VI, page 3 which is a reproduction of Exhibit R-22). Under cross-examination, Dr. Gordon recanted:

Yes, but I didn't use the testimony (Exhibit AMS-2) as evidence that a relationship existed. That is the only evidence you can draw from the

---

\* Exhibit R-30, p. 14.

testimony...we now have the additional evidence on the basis of which I drew the conclusion, namely, the Gordon-Halpern paper.\*

The Gordon-Halpern study produced the following relationships between market and earnings Betas for U.S. firms:

$$\text{Beta}_{\text{market}} = 0.564 + 0.251 \text{ Beta}_{\text{earnings}} \quad (\text{Eq. 4})$$

and

$$\text{Beta}_{\text{market}} = 0.278 + 0.584 \text{ Beta}_{\text{earnings}} \quad (\text{Eq. 5})$$

The nature of the regression process in the first case (equation 4) leads to a downward bias in the slope coefficient and an upward bias in the intercept. The second equation (equation 5) has an upward bias in the slope coefficient and a downward biased intercept. We expect the proper, unbiased estimate to lie somewhere between the two. One procedure adopted in such cases is to utilize the average of the two. Column 2 of Table V shows the range in market Betas developed from equations (4) and (5). In their development of this

---

\* Gordon, M. and Halpern, P., "Cost of Capital for a Division of a Firm," Journal of Finance, September, 1974 (also, as Exhibit R-17).

TABLE V			
CP Rail and CP Grain Market Beta Estimated from Earnings Beta			
	Beta Earnings	Beta Market	Average Beta Market
CP Rail	0.64	.72 - .65	0.69
CP Grain			
Low	-0.24	.50 - .14	0.32
High	0.00	.56 - .28	0.42
Source: Exhibit R-30, p. 16, Exhibit AMS-17, p. 152 and Exhibit AMS-2, p. 66.			

point, the railways chose to ignore this bias and used only equation (4). The result of this was to produce consistently higher estimates of market Betas based on earnings Betas. As can be seen in Table V, the upper estimates are more closely grouped and strengthen the railways' conclusion:

these results do not invalidate the conclusion that CP Rail is indistinguishable in risk from CP Corporate. The Grain beta is lower, but is dependent on the estimate or (sic) beta\* (refers to earnings Beta)

Further, the railways argued:

it would be unwise to base any inferences with respect to the earnings beta - market beta relationship on U.S. data when Canadian data are readily available.\*\*

---

\* Exhibit R-30, p. 17.

\*\* Exhibit R-30, p. 16.

Accordingly, the railways computed earnings Betas and market Betas for 106 of the 157 companies in the five risk quintiles\* for which data was available and computed the following regression results:

$$\text{Beta}_{\text{market}} = 1.071 + 0.013 \text{ Beta}_{\text{earnings}} \quad (\text{Eq. 6})$$

Because of the poor measures of significance (an  $r^2$  of 0.02), the railways suggested the market Beta of a company would be suitably estimated as being equal to the mean value of this sample of earnings Betas (i.e., the average of the second column of Schedule VII) which produces a market Beta of 1.084. Having adopted this technique they then concluded:

Applying this result to CP Rail and CP Grain, using Dr. Gordon's computed and estimated earnings betas, yields estimates of 1.084; Given the standard error, these do not permit rejection of the finding that CP Rail and CP Grain are approximately as risky as CP Ltd.\*\*

The railways neglected to point out that, under this technique, the analyst would be unable to reject the finding

---

\* This and other data for the five quintiles appear as Schedule VII.

\*\* Exhibit R-30, p. 17.



that any company was approximately as risky as CP Limited. The application of this technique to any stock will suggest that it has a systematic risk which is virtually the same as the market portfolio. Using this estimation procedure, one would conclude that CP Grain, CP "Non-Grain," and CP Rail all had estimated market Betas of 1.084. This is clearly contradictory to evidence presented elsewhere. In short, this Commission, though attracted to the use of Canadian data in analyzing this Canadian problem, could not accept the argument advanced by the railways on this point. The subsequent railway rebuttal submission comment that the article by D. J. Thompson<sup>\*</sup> found that earnings Betas explained a "miniscule" percentage of market Betas was certainly supported by their analysis of these 106 companies which produced an  $r^2$  of 0.02.

The final section of the railway rebuttal to the development of Beta-type statistics for CP Grain addressed the Provinces' process of inferring a market Beta from earnings Betas that were derived from physical Betas. Since a market Beta for CP Grain could not be developed (due to lack of security market

---

<sup>\*</sup>Thompson, D. J., "Sources of Systematic Risk in Common Stocks," Journal of Business, April 1976, pages 173-188.

information), the Provinces chose to use earnings Betas to estimate the former. However, the earnings data for CP Grain were not readily available, so it was estimated by Beta type statistics produced by correlating tonnages of grain shipped with corporate earnings (these earnings were the basis of the CP Rail earnings Betas). With respect to this relationship, the railways emphatically argued:

No evidence is presented that such a link has ever been demonstrated in the scientific literature, nor that the method has been accepted in any regulatory proceeding anywhere, for any purpose, in a cost of capital proceeding.\*

To test the strength of the postulated relationship, the railways constructed a sample of eight companies (five utilities and three companies in which CP Ltd. have a considerable holding) and computed their earnings Betas and physical Betas as shown in Table VI. The regression relationship for these two sets of observations was:

$$\text{Beta}_{\text{earnings}} = 0.9243 + 0.005 \text{ Beta}_{\text{physical}} \quad (\text{Eq. 7})$$

---

\* Exhibit R-30, p. 19.

Table VI  
Comparison of Physical Volume Betas with  
Earnings Betas for Selected Companies

Company	Basis	Period	Physical Beta Value	Earnings Beta Value	Market Beta Value
Calgary Power	kwh	61-74	- .0486	- .042	0.875
B.C. Telephone	calls	61-74	.0959	.330	0.409
Bell Canada	calls	61-74	- .0216	.125	0.235
TransCanada Pipeline	gas volume	57-74	-13.440	.178	0.898
Algoma Steel	steel tonnage	54-74	.2405	.655	0.876
Consumers Gas	gas volume	50-74	.1658	- .041	0.531
Cominco	zinc tonnage	50-74	.1546	2.596	1.159
Great Lakes Paper	paper tonnage	50-74	.0317	5.549	1.350

Source: Exhibit R-30, pp. 66-71.

As in the case of the relationship between market and earnings Betas for Canadian companies, the railways did not find a significant relationship between earnings and physical Betas<sup>\*</sup> and concluded that the substitution of the mean value of physical Beta of the sample (-1.603) provided as good an estimate of the earnings Beta as did the regression equation (equation 7).

---

<sup>\*</sup>The computed  $r^2$  for equation 7 was only 0.09.

The Provinces used a zero earnings Beta for grain, which was based on the results of regressing 1950-1974 grain volumes on CP Rail corporate earnings. To further test this result, the railways' cost of capital expert computed physical Betas for 35 other high volume commodities hauled by the railways. The results of this analysis are shown in Schedule VIII. The essence of the railway argument was that if CP Rail has an earnings Beta different from zero, then a zero physical Beta for grain traffic, to have meaning, would have to be accompanied by physical Betas for other types of traffic which were significantly different from zero. Of the 35 commodities, only 6\* had computed physical Betas significantly different than zero; however, these were:

scarcely large enough to account for the observed systematic risk of CP Rail earnings, nor for the observed value of the market beta for CP Ltd. One must either conclude that the market beta observation is in error, or that this method of deriving it is worthless.\*\*

---

\* The railway submission erroneously referred to 40 commodities and reported only 5 as significant ("Portland Cement" was omitted in error). See Transcript, Vol. 33, p. 6358 where this oversight is agreed.

\*\* Exhibit R-30, p. 21.

As evidenced by their arguments, the railways chose to accept the latter conclusion.

In cross-examination of Dr. Quirin, the Provinces pointed out that the list of commodities contained six classes of grain traffic (barley, corn, oats, wheat, wheat flour, and flaxseed) which had an average physical Beta of -0.047 and that the remaining 29 nongrain commodities had an average physical Beta of 0.348, with a t-statistic of 3.43.\* This led the Provinces to ask:

Don't these two numbers suggest to you that the Beta for grain does not differ significantly from zero while the Beta for non-grain traffic does?\*\*

In response, Dr. Quirin disagreed and stated that he had also tested the Beta for total tonnage and found that it likewise did not differ significantly from zero, and reiterated his findings that only a few of the individual commodities had Betas significantly different from zero.

---

\* This would give rise to acceptance of the conclusion that the probability that an item of nongrain traffic has a zero Beta or less is below one percent.

\*\* Transcript, Vol. 33, p. 6359.

In summary, the Provinces argued that CP Rail was materially less risky than the other operations of CP Limited. In support of this, the Provinces computed the mean absolute percentage deviation of income from its trend line for CP Rail, CP Ltd., and other companies in which CP Ltd. has an interest.

TABLE VII	
Mean Absolute Percentage Deviation in Earnings from the Trend Value in Earnings for Selected Companies or Divisions	
Company	Statistic
C.P. Investments	.289
C.P. Telecommunications	.440
C.P. Air	.417
C.P. Ships	1.073
Cominco	.252
Algoma Steel	.364
Great Lakes Paper	.413
C.P. Rail	.182
C.P. "Non-Rail"	.292
C.P. Ltd.	.230
Source: Exhibit AMS-28 and Transcript, Vol. 33, p. 6265.	



This was the measure of risk utilized by Dr. Quirin in his analysis of CP Rail:\*

Dr. Quirin: There are lots of studies demonstrating a relationship between one of those measures (mean absolute deviation or interquantile range) which I regard as somewhat interchangeable and security yields. Presumably, therefore, they were introduced as measures of risk and appear to do some job of explaining yield differences and therefore I would assume that they are adequate measures of risk on these bases. I was not trying to measure market Betas because I am not convinced that market Betas are necessarily the most desirable solitary measure of risk. I have relied on five of which market Betas are one.\*\*

The Provincial contention was that:

Mr. Foran: CP other would accordingly have a mean absolute deviation of approximately 60 percent larger than CP Rail, is that correct?

Dr. Quirin: Yes. I was not attempting to distinguish rail from other. I was attempting to distinguish it from total.\*\*\*

As clarified by the Commissioner:

The Commissioner: ... whether you used the 18.2 (CP Rail) or the 23.0 (CP Ltd.) both of those numbers fall into the same place on sort of the scale of risk in the same category.

Dr. Quirin: Right.

The Commissioner: So that there would be no difference whether you use one or the other?

---

\* Exhibit R-4, and Transcript, Vol. 33, p. 6261.

\*\* Ibid., p. 6263.

\*\*\* Ibid., p. 6265.

Dr. Quirin: That is right. The difference between rail and nonrail is larger but the non-rail is still small relative to rail, so it gives a correspondingly lower rate in the total and the ranking of the rail would be essentially that of the nonrail in my opinion\*

Having pursued this point, we should also quote from the related testimony of the Provincial cost of capital expert witness:

Dr. Gordon: Since my earlier study was referred to I might point out that my recollection is that this research found little, if any, explanatory power in standard deviation which is somewhat related to mean absolute deviation. It had very little explanatory power in terms of security prices.\*\*

To this point, we have concentrated on risk measurement as advocated by the Provinces and rebutted by the railways. We should also note that United Grain Growers addressed this point:

UGG agrees with the first step in the Provinces logic, that, with fluctuation in grain movement being asynchronous with the business cycle, carriage of grain is an attractive endeavor for the railways, and in all likelihood does have the effect of reducing the overall risk of CP Rail.

We cannot accept, however, the subsequent steps taken by the Province... Even setting aside the artificiality of the exercise, the allocation, to

---

\* Ibid., pp. 6269 and 6270.

\*\* Ibid., p. 6264.

grain, of the entirety of the reduced risk (and hence the entirety of the incremental debt) cannot, in our view, be justified. The reduction of risk is attributable to the co-existence of grain and all other traffic within the single rail enterprise, and as such is a fortuitous circumstance whose benefits cannot be solely attributable to grain.

On the other hand, we cannot accept the railways' proposition that the "legislative risks" should have an upward pressure on the required cost of capital for grain.\*

The railway position with respect to systematic risk was best summarized by them in their Exhibit R-4:

There is no universal agreement as to how risk should be measured, nor is there any convincing evidence that market valuations (and costs of capital) are determined by any single measure.\*\*

The railways utilized market Betas as one measure of risk, but also included the following four others:

- maximum percentage earnings shortfall below trend;
- mean absolute earnings deviation about moving average;
- maximum annual share price drop; and
- standard deviation of monthly price appreciation.\*\*\*

---

\* Exhibit UGG-2, p. 11.

\*\* Exhibit R-4, p. 35.

\*\*\* Ibid., p. 36.

These measures along with the market Beta analysis provided the ordinal measure of risk utilized by the railways to estimate the appropriate equity funds rate for CP Limited. The railways' findings on these measures of risk are discussed subsequently in this Volume.

The railway cost of capital expert also examined the variability of the income stream from the company's rail operations and compared this with the variability for the nonrail operations of CP Limited. He concluded that, though not identical, "the differences were not judged to be sufficiently large to affect the risk ranking of the company."\*

Further, notwithstanding the calculated levels for CP Rail and CP Non-Rail shown in Table VII, the railways found that the high correlation (0.88) between deviations from fitted trend lines for rail and nonrail operations led to the conclusion:

The hypotheses that rail operations are lower in risk than non-rail operations, or that they contribute to a reduction in the riskiness of consolidated operations, must be rejected.\*\*

---

\* Ibid., p. 46.

\*\* Ibid.

When asked if it would have been more appropriate to look at the direct correlation between CP Rail and CP Other rather than the correlation between their individual deviations from respective trend lines, Dr. Quirin responded:

Dr. Quirin: It might have been more appropriate to look at that. However, it was not what we looked at.

The Commissioner: You did, however, Dr. Quirin find some degree of less riskiness in CP Rail which you then effectively offset on a judgement basis with a regulatory risk.

Dr. Quirin: With a variability in earnings slightly above the trend and I think the trend itself perhaps was a fact that influenced my judgement as well.\*

And further, with respect to grain transportation:

The Commissioner: Now, Dr. Quirin, did you make any effort to determine whether grain is less risky than CP Rail other than to conclude the fact that losing money as of now makes it a very risky endeavor?

Dr. Quirin: No sir, there is no strong relationship between the volumes moved of grain and CP earnings.\*\*

Further along, on the same topic:

The Commissioner: Dr. Quirin, do you agree with the thought that I conveyed in which I think Dr. Gordon agreed to some extent that in fact if we are going to deal with CP Grain as an entity and test its riskiness that there is at this stage an incestuous relationship between what comes out of this Commission's

---

\* Transcript, Vol. 36, p. 6931.

\*\* Ibid., p. 36, p. 6933.

effort and the potential riskiness or non-riskiness of grain?

Dr. Quirin: Absolutely, sir. I think this inquiry is part of the political risk. In view of what has happened I would gather that the inquiry is political. And the fact that it is held at all is indicative that there is a political risk.\*

### Conclusions

Based on the analysis presented by the cost of capital experts representing the railways and the Provinces, the Commission reached the following conclusions:

- there was no identifiable difference in the risk of CP Rail compared to that of CP Limited;
- currently, CP Grain is infinitely risky, since variable costs exceed revenues;
- the counter-cyclical nature of CP Grain made it potentially somewhat less risky than the total operations of CP Rail; and
- the future risk of CP Grain was dependent, in some sense, on the actions of this Commission and the Hall Commission, such that this cost determination process could itself affect its relative risk level.

This Commission further concluded that the realistic approach was to assume that the risk of CP Grain was identical to that of CP Rail and, therefore, to that of CP Limited for the purpose of determining the capital funds

---

\* Ibid., p. 6945.



cost attributed to the transportation of statutory grain. Due to present uncertainties as to future government actions in the area of grain carriage and rates, the Commission recommends that all future determinations of the cost of transporting statutory grain by rail include an evaluation of the risk factors which could have bearing on the relative and absolute risk of CP Limited, CP Rail, and CP Grain.



## CHAPTER V

### CAPITAL STRUCTURE

One procedure commonly used to develop a cost of funds rate is to determine rates for each of the individual components in the capital structure and to weight these by the relative proportion that each component represents in the overall structure. This process is illustrated in Table VIII for a hypothetical capital structure comprised of ten percent debt, ten percent preferred equity and eighty percent common equity.

TABLE VIII Hypothetical Cost of Funds Computation			
Item	Percent of Structure	Cost Rate	Weighted Average
Debt	10%	5%	.5%
Preferred Stock	10	10	1.0
Common Stock	<u>80</u>	15	<u>12.0</u>
Weighted Average	100%		13.5%

This procedure gives explicit recognition to the relative importance of each type of financial instrument utilized by the company in obtaining investment funds. If the cost rates remain the same, the relative importance of each component will have a significant impact on the weighted average rate. For example, Table IX shows that a realignment of the capital structure displayed above to reflect an eighty percent debt component results in a 7.0 percentage point reduction in the weighted average cost rate. Thus,

<p>TABLE IX</p> <p>Realigned Hypothetical Cost of Funds Computation (Assumes no change in capital funds rates)</p>			
Item	Percent of Structure	Cost Rate	Weighted Rate
Debt	80%	5%	4.0%
Preferred Stock	10	10	1.0
Common Stock	<u>10</u>	15	<u>1.5</u>
Weighted Average	100%		6.5%

the importance of the relative distribution of the source of funds in the capital structure is dependent upon the extent to which the relative percentages affect the cost rates

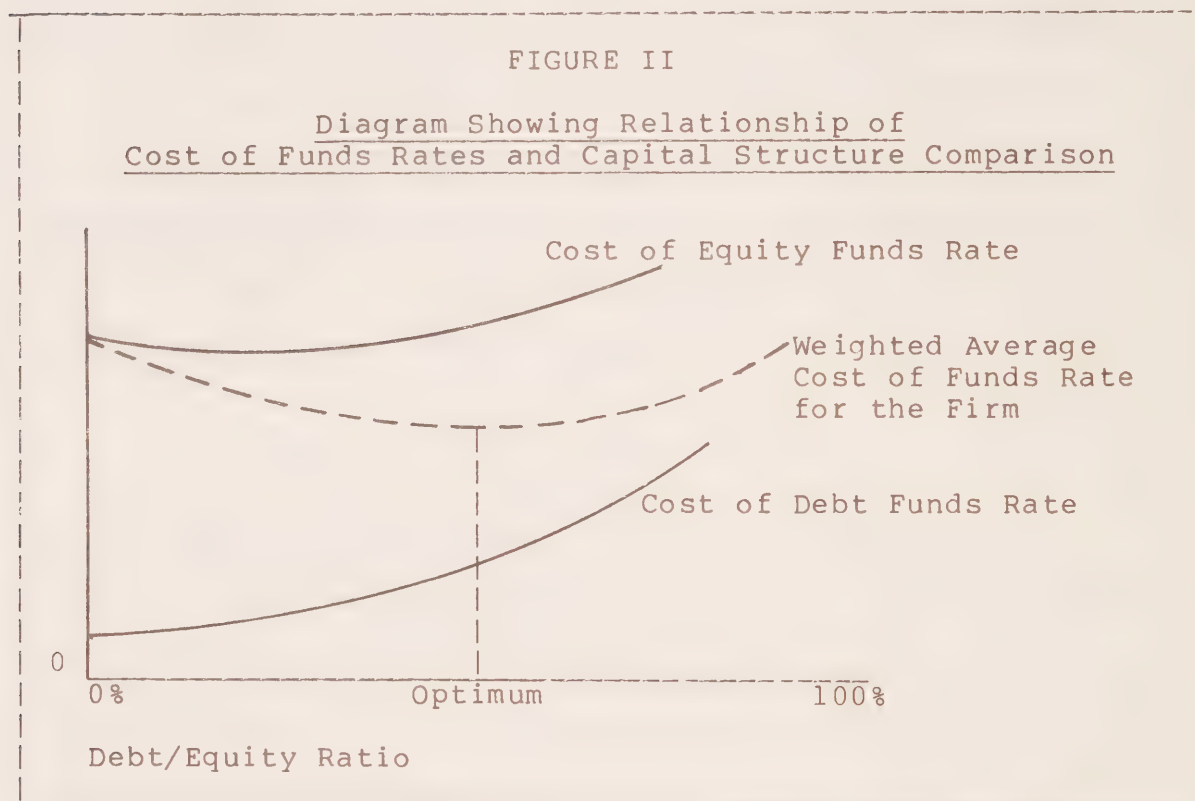
of the financial instruments.

### The Basic Issues

Traditional theory holds that the overall or weighted average cost of funds rate for a firm whose entire capitalization has been derived from equity sources can be reduced through the substitution of debt for some equity, i.e., certain amounts of debt can be obtained at a cost of funds rate below that for an equivalent amount of equity. This view holds that the riskiness of providing both debt and equity funds increases as the amount of debt is increased beyond some level.

The concept rests on the proposition that the changes in the cost of equity funds and the interest rates on debt funds as the amount of debt in the capital structure is increased do not offset the difference between debt and equity rates. The concept is limited by the belief that, beyond some ratio of debt to equity, the cost of debt funds rises rapidly, and the resultant higher debt/equity ratio increases the risk of not achieving the required returns on equity and, hence, increases the cost of these funds. This results in an overall cost of funds that is greater than it would be at a lower ratio of debt to equity. The imposition of these factors on the relationship

of debt and equity cost of funds rates gives rise to the traditional view that there is an optimum capital structure of the firm which minimizes the weighted average cost of funds rate for the firm.



In contrast, Modigliani and Miller<sup>\*</sup> and others have suggested that this approach is incorrect and that the weighted average cost of funds rate to the firm is insensitive to the

---

<sup>\*</sup> Modigliani, F., and M. H. Miller, "The Cost of Capital, Corporation Finance and the Theory of Investment," American Economic Review, June, 1958, pp. 261-297.



relative proportions of debt and equity in the capital structure (the M & M model). That is, for each shift in the debt/equity ratio, the debt equity funds rate will shift proportionately such that the weighted average cost of funds will remain unchanged. This hypothesis is advanced under assumptions of equal borrowing power for investors and corporations and, most importantly, no income tax (or specifically no double taxation) on earnings from equity. With respect to the reality of income taxes, the Provinces pointed out in their submission:

Regardless of what happens in the absence of a corporate income tax, it is universally agreed that, with a corporate income tax, the value of the firm increases and the weighted average cost of capital falls as the debt ratio rises.\*

These two approaches to capital structure formed the framework on which the Provinces and the railways developed the capital structure they believed to be appropriate to develop the capital funds cost associated with the transportation of statutory grain by rail. The Provinces held that the traditional approach was appropriate,

"is widely accepted in the business community, has considerable support among academics and has the weight of evidence in support of it."\*\*

While admitting that the empirical evidence which

---

\* Exhibit AMS-17, p. 91.

\*\* Ibid.

was available to date was conflicting and could be found to support either side of the issue, the railways concluded:

In my [Dr. Quirin's] opinion, the best of it (the evidence) is simply inconclusive, while the rest is irrelevant. Given the lack of convincing empirical evidence one way or the other, any choice must be made on grounds of logical consistency or realism of the premises. On these grounds, I would rather accept the Modigliani-Miller model, with respect to the influence of capital structure on the cost of funds, than the available substitutes.\*

In arguing that the capital structure was important in the determination of the weighted average cost of capital, the Provinces contended that this Commission need not be confined to the acceptance of the actual capital structure of the company. Citing the approach adopted by other regulatory agencies in determining whether the capital structure of the company was unnecessarily conservative, the Provinces argued that the objective of this Commission ought to be to arrive at

... a capital structure that represents a reasonable balance between the consumer's desire for a low cost capital and management's desire for a low level of risk... (and low) probability of bankruptcy.\*\*

Based on their analysis of risk, the Provinces concluded that the transportation of grain by CP Rail exhibited

---

\* Exhibit R-30, p. 42.

\*\* Exhibit AMS-17, p. 93.

characteristics of very low risk levels leading them to conclude that there was justification for:

a substantially lower fraction of common equity in its ('CP Grain') capital structure than in the capital structure for CP Rail or CP Limited as a whole.\*

A secondary and related issue arose from the Provinces' belief that the capital structure of a subsidiary company could be influenced by regulation. They argued that:

if we have a company with a regulated and unregulated subsidiary it is advantageous to the company to assign a small amount of debt and a large amount of equity to the regulated subsidiary and the opposite to the unregulated subsidiary.\*\*

In support of this, the Provinces introduced Exhibit AMS-13, reproduced as Table X (following page). In essence, the Provinces' position is "bottomed" on the proposition that the effect of assigning a particular capital structure to a wholly-owned subsidiary that is different than the capital structure of the parent has no impact on the actual profitability of an unregulated subsidiary but does have an impact on the profitability of a regulated subsidiary. Accordingly, reducing the debt ratio of the regulated subsidiary and raising the debt ratio for the unregulated subsidiary would raise

---

\* Exhibit AMS-2, p. 67.

\*\* Transcript, Vol. 12, p. 2198.

TABLE X

Consequences of Different Capital Structures  
for Regulated and Unregulated Subsidiaries  
Traditional Position

## Balance Sheet I

	Regulated	Unregulated	Total
Debt	\$ 20	\$ 80	\$ 100
Equity	<u>80</u>	<u>20</u>	<u>100</u>
TOTAL	\$ 100	\$ 100	\$ 200

## Income Statement I

Earnings before Interest & Taxes (EBIT)	\$ 17.00	\$ 25.00	\$ 42.00
Interest (5.0%)	<u>1.00</u>	<u>4.00</u>	<u>5.00</u>
Earnings before Taxes	16.00	21.00	37.00
Taxes (50% rate)	<u>8.00</u>	<u>10.50</u>	<u>18.50</u>
Net Income	\$ 8.00	\$ 10.50	\$ 18.50
After Tax Rate on Equity	10.0%	52.5%	18.50%

## Balance Sheet II

Debt	\$ 80	\$ 20	\$ 100
Equity	<u>20</u>	<u>80</u>	<u>100</u>
TOTAL	\$ 100	\$ 100	\$ 200

## Income Statement II

Earnings before Interest & Taxes	\$ 10.00	\$ 25.00	\$ 35.00
Interest (5.0%)	<u>4.00</u>	<u>1.00</u>	<u>5.00</u>
Earnings before Taxes	6.00	24.00	30.00
Taxes (50%)	<u>3.00</u>	<u>12.00</u>	<u>15.00</u>
Net Income	\$ 3.00	\$ 12.00	\$ 15.00
After Tax Rate on Equity	15.0%	15.0%	15.0%

Source: Exhibit AMS-13.

the overall after-tax income of the parent company. As a result, the Provinces concluded that:

it would be in the interest of CP Ltd. to assign a low debt ratio to CP Rail and to CP Grain.\*

The implications of Table X were explained by Dr. Gordon\*\* to be as follows. In the first instance, a company with an overall 50/50 debt/equity ratio allocates the debt and equity such that the regulated subsidiary has a 20/80 debt/equity ratio and the unregulated one has an 80/20 debt/equity ratio. The company has an after-tax income of \$18.50 for both subsidiaries combined. This after-tax income is comprised of earnings before interest and taxes (EBIT) of \$25.00 for the unregulated subsidiary and \$17.00 for the regulated subsidiary. With a five percent interest rate on debt and a 50 percent tax rate the company's EBIT of \$42.00 becomes \$18.50 after interest and taxes. The \$25.00 EBIT of the unregulated subsidiary is determined as a result of its activities in an unregulated market. The regulated subsidiary, however, is allowed a return on equity, after debt charges, which is determined by the regulator. In this example, this return

---

\* Exhibit AMS-17, p. 94.

\*\* Transcript, Vol. 12, pp. 2198-2200.

is assumed to be 10 percent after taxes, (i.e., \$8.00 net income on the \$80.00 of equity). In order to generate this \$8.00 of after-tax net income, the regulated company must be allowed to earn \$17.00 EBIT (\$8.00 after tax earnings on equity which requires \$16.00 earnings before taxes, plus 5 percent interest on debt of \$20.00 which requires \$1.00 of earnings before interest).

In the second instance, with the debt/equity ratios of the wholly-owned subsidiaries reversed, the unregulated subsidiary still has the same \$25.00 EBIT but with lower debt charges (i.e., 5 percent, now on \$20.00 rather than on \$80.00). This results in a net income of \$12.00 as compared to the \$10.50 in the first example. For the regulated subsidiary, the lower equity portion is assumed to require a 5 percent increase in the permitted return (i.e., 15 percent after taxes or \$3.00 on \$20.00 of equity) and the same interest rate of 5 percent on the 80 percent debt portion. To generate these returns requires \$10.00 EBIT on the 80/20 debt/equity ratio.

The result of this reallocation of debt/equity between the two wholly-owned subsidiaries is that when a greater portion of the debt is in the regulated subsidiary (Case II) the earnings before interest and taxes and net income are lower. Accordingly, the Provinces argued, a positive incentive exists to shift debt to an unregulated subsidiary and equity



to the regulated subsidiary. However, Dr. Gordon pointed out that:

if we assign a high enough cost to equity capital, the conclusion I reached does not hold.\*

The validity of this statement can be illustrated by reference to the Provinces' example (Table X). The earnings of the unregulated subsidiary with an 80/20 debt/equity ratio (Case I) implied a 52.5 percent after tax return to equity, while with a 20/80 (Case II) ratio these earnings implied a 15.0 percent return. If this same differential is applied to the regulated subsidiary under Case II the required after-tax return to equity would be \$7.00 ( $.525/.15 \times .10 \times \$20 = \$7.00$ ) with the following (Table XI) result for Income Statement II of Table X. Thus, under these conditions, the effect

TABLE XI			
Restatement of Traditional Approach Income Statement II			
Item	Regulated	Unregulated	Total
Earnings before Interest & Taxes	\$18.00	\$25.00	\$43.00
Interest	<u>4.00</u>	<u>1.00</u>	<u>5.00</u>
Earnings before Taxes	14.00	24.00	38.00
Taxes	<u>7.00</u>	<u>12.00</u>	<u>19.00</u>
Net Income	<u>\$ 7.00</u>	<u>\$12.00</u>	<u>\$19.00</u>
After Tax Rate on Equity	35.0%	15.0%	19.0%

\* Transcript, Vol. 12, p. 2200.

is opposite to that proposed by the Provinces in that, rather than falling, the overall return for the parent company rises from 18.5% (Case I) to 19.0% (Case I restated) as a result of shifting more debt to the regulated company.

In rebuttal the railways accentuated this point and observed that part of the effect of the example arises from the wide swing in the Provinces' capital structures of the subsidiaries. They submitted a counter-example in which the net profits of the combined subsidiaries do not change under alternative assumptions about the costs of debt and equity and under a rather less extreme variation in capital structure.\* This example is produced as Table XII (following page).

While the numbers are different, the absolute earnings before interest and taxes in the unregulated subsidiary and the capital structure of the parent company remain unchanged. The capital structures of the two subsidiaries are "reshuffled" in both the Provincial example and the railway counter-example. In the Provincial example, it is assumed that the cost of capital of the component parts and the overall cost of capital of the parent company can be affected by redesignation of the capital structures, so that investors requiring 10 percent return on the 20/80 debt/equity structure of the regulated subsidiary raise this to 15 percent when equity is only 20 percent of the structure. The railway example rests on the assumption that capital structure is

---

\* Exhibit R-30, p. 40.

TABLE XII

Consequences of Different Capital Structures  
for Regulated and Unregulated Subsidiaries  
Modigliani - Miller Position

## Balance Sheet I

	Regulated	Unregulated	Total
Debt	\$ 30	\$ 70	\$ 100
Equity	<u>70</u>	<u>30</u>	<u>100</u>
TOTAL	\$ 100	\$ 100	\$ 200

## Income Statement I

Earnings before Interest & Taxes	\$ 20.30	\$ 28.70	\$ 49.00
Interest (11.0%)	<u>3.30</u>	<u>7.70</u>	<u>11.00</u>
Earnings before Taxes	17.00	21.00	38.00
Taxes (50% rate)	<u>8.50</u>	<u>10.50</u>	<u>19.00</u>
Net Income	\$ 8.50	\$ 10.50	\$ 19.00
After Tax Rate on Equity	12.1%	35.0%	19.0%

## Balance Sheet II

Debt	\$ 70	\$ 30	\$ 100
Equity	<u>30</u>	<u>70</u>	<u>100</u>
TOTAL	\$ 100	\$ 100	\$ 200

## Income Statement II

Earnings before Interest & Taxes	\$ 20.30	\$ 28.70	\$ 49.00
Interest (11.0%)	<u>7.70</u>	<u>3.30</u>	<u>11.00</u>
Earnings before Taxes	12.60	25.40	38.00
Taxes (50% rate)	<u>6.30</u>	<u>12.70</u>	<u>19.00</u>
Net Income	\$ 6.30	\$ 12.70	\$ 19.00
After Tax Rate on Equity	21.0%	18.1%	19.0%

Source: Exhibit R-30 p. 40.

irrelevant, so that reshuffling the subsidiary structures does not affect the overall cost of capital to the parent company.

This Commission agreed with the Provinces that the capital structure is relevant in the determination of capital costs. However, we did not agree that any positive incentive existed for CP Limited to reshuffle its capital structure between its regulated\* and unregulated subsidiaries.

#### Capital Structures Submitted

Neither CP Grain nor CP Rail exists as a separate, self-financing entity. As such, both parties had to impute a capital structure. The railways advocated that the CP Rail capital structure used for CTC purposes shown on Table XIII (following page) be adopted by the Commission in arriving at the weighted average cost of funds rate. The structure was:

developed for the CTC and its predecessor, the BTC, tested in hearings before those bodies and accepted by them as an appropriate allocation of the company's debt and equity capitalization to its rail operations.\*\*

In support of this, the railways pointed out that by

---

\* In the sense in which Dr. Gordon referred to regulated subsidiaries, as those where the regulator allowed a rate of return on equity, CP Rail would be an unregulated subsidiary and largely would fall outside of the effects of this example.

\*\* Exhibit R-30, p. 30.

TABLE XIII

Canadian Pacific Limited  
Capital Employed in the Rail Enterprise

	Aggregate Amount at Dec. 31/74	Percent of Total
Equipment Trust Certificates	\$ 79,593,321	5.36%
Leased Line Securities Not Owned		
Sterling	43,996,382	2.96
U.S.	54,600	-
Canadian	23,356,435	1.57
Collateral Trust Bonds	98,801,477	6.66
Bank Loans	15,000,000	1.01
Perpetual 4% Consolidated Debenture Stock		
Sterling	148,587,597	10.01
U.S.	<u>35,906,123</u>	<u>2.42</u>
Total Debt	\$ 445,295,935	29.99%
Preference Stock		
Sterling	\$ 42,569,082	2.87
Canadian	32,624,766	2.20
Preferred Stock	35,656,642	2.40
Ordinary Stock & Retained Earnings	<u>928,229,891</u>	<u>62.54</u>
Total Capital Employed	\$1,484,376,316	100.00%

Source: Exhibit R-4, p. 56.

allocating capital to CP Rail on the basis of the CTC capital structure, it is implied that the nonrail activities of CP Ltd. had 39 percent debt and 61 percent equity structures (based on CP Ltd. Corporate) which

is probably appropriate for the non-rail operations taken as a group.\*

The CP Rail capital structure arose from the so-called "split balance sheet" submitted, in 1949, by the Canadian Pacific Railway Company as Exhibit 49/49 in the course of the "Twenty Percent Case." Based on the principles of Exhibit 49/49, as amended by the findings of the Board of Transport Commissioners in that case, the separation of the debt and equity between railway and nonrailway activities for the year 1950 is shown in Table XIV. Below this is shown the same information for the year 1974. The relative amount of debt in the CP Rail Capital Structure increased from 6.5% in 1950 to 30.7% in 1974. This tends to forcefully refute the Provincial suggestion that such a separation may reflect an incentive due to the effects on "regulated" and "unregulated" subsidiaries, as described earlier.

Finally, the railways contended that when consideration of the differences in the incidence and treatment of preferred stock between Canada and the United States are recognized:

... CP Rail's capital structure does not appear to be out of line with the capital structures of solvent Class I railroads in the U.S.\*\*

---

\* Ibid., p. 34.

\*\* Ibid., p. 37.



TABLE XIV

Railway and Non-Railway Capital Structures  
of Canadian Pacific Limited

	December 31, 1950					
	Railway		Non-Railway		Total	
	Amount (000)	Percent	Amount (000)	Percent	Amount (000)	Percent
Funded Debt	\$ 77,907	7.6%	\$ 4,834	1.9%	\$ 82,741	6.5%
Perpetual 4% Consolidated Debenture Stock	212,917	20.9	57,970	22.2	270,887	21.1
Leased Line Securities	67,208	6.6	-		67,208	5.2
Preference Stock	121,393	11.9	-		121,393	9.5
Common Equity	540,444	53.0	198,454	75.9	738,898	57.7
	<u>\$1,019,869</u>	<u>100.0%</u>	<u>\$ 261,258</u>	<u>100.0%</u>	<u>\$1,281,127</u>	<u>100.0%</u>
	December 31, 1974 (Consolidated)					
	Amount	Percent	Amount	Percent	Amount	Percent
Funded Debt	\$ 193,394	13.0%	\$1,056,470	40.9%	\$1,249,864	30.7%
Perpetual 4% Consolidated Debenture Stock	184,494	12.5	108,055	4.2	292,549	7.2
Leased Line Securities	67,407	4.5	-	-	67,407	1.7
Minority Shareholders' Interest	-	-	571,711	22.2	571,711	14.1
Preference Stock	110,851*	7.5	-58,998	-2.3	58,853**	1.3
Common Equity	928,230	62.5	901,175	35.0	1,829,405	45.0
	<u>\$1,484,376</u>	<u>100.0%</u>	<u>\$2,578,413</u>	<u>100.0%</u>	<u>\$4,062,789</u>	<u>100.0%</u>

Source: Exhibits CP-24, R-4, p. 56 and AMS-5.

\*Includes premium on preferred.

\*\*Par value only (no premium).

As can be seen from Table XV, solvent U.S. railroads have a basic 36/64 debt/equity ratio.

TABLE XV  
Comparative Capital Structures  
and Rates of Return for Solvent U.S. Railroads  
and All U.S. Investor-Owned Electric  
Utility Companies 1/  
(000,000)

	Electric Utilities		Railroads	
	Amount	Fraction	Amount	Fraction
Debt	\$ 56,673	.52	\$ 9,129	.36
Preferred	13,089	.12	468	.02
Common Equity	<u>38,567</u>	<u>.36</u>	<u>15,486</u>	<u>.62</u>
TOTAL	\$108,329	1.00	\$25,083	1.00
Interest on Debt	\$ 3,203		\$ 422	
Preferred Dividends	790			
Earnings on Common	<u>4,196</u>		<u>666</u>	
Earnings After Taxes	\$ 8,189		\$ 1,088	
After Tax Return on Capital	7.56%		4.34%	
Return on Common Equity	10.9%		4.3% <u>2/</u>	

1/ Based on December 31, 1973 balance sheet and 1973 income statements.

2/ Based on the assumption that the dividend on the preferred was 8%.

Source: Exhibit AMS-25.

The Provinces, because of their conclusions regarding the risk of grain transportation, argued in favour of a capital structure for "CP Grain" (i.e., the portion of CP Rail engaged in grain transportation) as shown on Table XVI.

TABLE XVI	
Percentage Weighting of Capital Structure for CP Grain as Proposed and Utilized by Provinces	
	Percent
Debt	60.0%
Deferred Taxes	7.5
Preferred Stock	5.0
Common Stock	<u>27.5</u>
	100.0%
Source: Exhibit AMS-2, pp. 67 and 68.	

This capital structure, while less detailed than that of the railways, did contain sufficient detail to permit the development of a weighted average cost of capital for CP Grain. In their summary submission, the Provinces very poignantly stated the overriding concern which led to their development of a capital structure for CP Grain which was more heavily leveraged:

For unregulated companies capital structures vary over a wide range due to the preferences with regard to risk and return of the companies' managements. This freedom is not permissible for a regulated company or for any company or division where capital cost determination is to be made. Under these circumstances, the investor does not bear the cost of any unduly conservative capital structure, and the task is to arrive at a cost of capital which represents a reasonable balance between risk to the company and cost to the consumer or others who bear the capital costs. Arriving at an unduly conservative structure is no different than overstating operating costs.\*

In support of their contention that the capital structure for CP Rail, as submitted by the railways before this Commission and as utilized by the Canadian Transport Commission, did not represent a meaningful allocation of the capital structure of CP Limited, the Provinces argued that the relationship between the capital structures of CP Air and CP Rail were incompatible with their relative levels of riskiness. From the balance sheet of CP Air as at December 31, 1974, the debt/equity ratio was 75/25 while the comparable CP Rail ratio was 30/70. Based on a measure of risk developed in the same manner as that employed by the railways, the Provinces concluded that:

---

\* Submission of the Provinces of Alberta, Manitoba, and Saskatchewan on Capital Costs, p. 6.

CP Air is substantially more risky than CP Rail. We have here one management concerned with both CP Rail and CP Air. If the capital structure of each should reflect the CP Ltd. perception and balancing of risk, CP Rail should have a higher debt ratio than CP Air. Instead the reverse is true by an extraordinarily wide margin.\*

#### Capital Structure Selected

As an appropriate capital structure for determining the capital costs associated with the transportation of grain by rail, this Commission adopted the capital structure of Canadian Pacific Limited (Consolidated) shown in Columns 2 and 3 of Table XVII. For convenience, we have also shown the capital funds rate applied to each capital component by the Commission in its determination of the weighted average capital funds cost applicable to the transportation of statutory grain.

---

\* Exhibit AMS-17, p. 94.

TABLE XVII

CP Limited Capital Structure and Capital Funds Rate Utilized  
in Commission's Cost Calculations

Capital Component	Amount (000)	Percent	Cost Rate		Weighted Rate	
			After Tax	Before Tax*	After Tax	Before Tax*
Long-Term Debt	\$1,317,271	32.4%	XX	XX	XX	XX
4% Debentures	<u>292,549</u>	<u>7.2</u>	XX	XX	XX	XX
Total Debt	1,609,820	39.6%	6.75%	6.75%	2.67%	2.67%
Preferred Stock	36,103	0.9%	7.34	15.40	0.07	0.14
Preference Stock	15,750	0.4	0.72	1.51	0.00	0.01
Common Stock & Minority Shareholders' Interest	2,401,116	59.1	14.50	30.43	8.57	17.98
Total Equity	2,452,969	60.4%	XXX	XXX	8.64%	18.13
Total	<u>\$4,062,789</u>	<u>100.0%</u>	XXX	XXX	<u>11.31%</u>	<u>20.80%</u>

\*Tax Rate of 52.35%.

SOURCE: Exhibit CP-24 (Revised) and Commission's Calculations.

This straightforward structure does not correspond specifically to the liabilities side of the balance sheet of CP Limited (Consolidated) because it aggregates minority shareholders' interest with common shareholders' equity, neglects



current liabilities, and does not include, specifically, the following items:

- deferred income taxes
- unfunded pension liability
- working capital

In addition, though indirectly included, the structure does not segregate the following additional items:

- premium on preferred stock
- donations and grants
- inert assets
- capitalized leases

#### Analysis of Potential Adjustments to the Selected Capital Structures

In its report, the Commission noted that it was to be concerned about these items to a greater or lesser degree. Specifically, the existence of deferred income taxes was recognized and its intrinsic relationship to working capital allowances was discussed. The other items, though real in every respect, were not discussed in the same detail. As noted in the report, some of these items are explicitly recognized in the Annual Report to Shareholders, others are not.

### Deferred Income Taxes

For 1974, CP Limited showed a deferred tax liability of \$445,837,000.\* Briefly, this amount represents the deferred liability of the accumulated historical difference between the nominal or "book" tax liability and the actual tax liability. In essence, the difference arises, on an annual basis, from the difference between the rate at which the company amortizes the initial capitalization of an asset and the rate of depreciation permitted for the computation of taxable income. The difference may also arise from the company's ability to deduct an item of expense from income, for the purpose of tax computation, versus its accounting treatment of the same expense which amortizes the item over a period in excess of the one year.\*\*

As an illustration, the net income of CP Limited (Consolidated) in 1974, before taxes but after interest charges, was \$399,322,000. The book tax liability on that amount was

---

\* Exhibit CP-17, p. 13.

\*\* At page 7 of the Annual Report, the following is noted: "The companies follow the tax allocation basis of accounting for income taxes whereby tax provisions are based on accounting income and taxes relating to timing differences between accounting and taxable income are deferred."

\$204,964,000 or 51.33 percent.\* However, because of the provisions of deferred taxes, only \$155,472,000 was charged to income as a current expense and the remaining \$49,492,000 was deferred. The result of this was that the company had an effective tax rate of 38.93 percent. This difference and the existence of these \$49.5 million gave rise to some considerable debate over the appropriate treatment of deferred taxes. CP Limited's Annual Report to Shareholders listed the annual amount of taxes deferred (along with other items) under "Source of Funds." The accrued amount is included as one of the noncurrent liabilities in the Consolidated Balance Sheet.

Briefly, one side of the debate suggests exclusion of deferred taxes from any consideration in the determination of the capital structure. A second argues that it represents an interest-free loan from the Government and that the proper treatment would be to include the total accrued amount as debt at a zero interest rate. The third side

---

\* Exhibit CP-17 and CP-28 (Revised). This rate compares to the rate of 52.35 percent used in computing the "before tax" rate of return for earnings subject to income tax. This 52.35 was the income tax rate effective in 1974 and incorporated the 10% corporate surtax imposed in the November 1974 fiscal budget effective back to May 1, 1974, raising the income tax rate from 50.90% to 52.35%.

would include the total accrued amount as contingent equity and accord it the same rate as was determined for common shareholders' equity. Lastly, some would include the total accrued amount as a noncurrent liability but not designate it as either pseudo-debt or pseudo-equity, but rather treat it as part debt and part equity. This latter case treats the same percentage of the deferred taxes as debt as debt contributes to the overall capital structure. In the determination of a weighted cost of funds rate, the first and fourth cases are synonymous. However, depending on the procedure used in developing the capital funds cost, the latter case will generally result in the estimation of higher costs, since the base to which that rate would be applied would be larger.

In their submissions before this Commission, the Pools<sup>\*</sup> argued that these deferred taxes were zero-cost debt<sup>\*\*</sup> (they referred to it as "Non-Interest-Bearing-Debt"). The Provinces in developing their weighted average cost of capital for CP Rail grain traffic, similarly treated deferred taxes as

---

\* Alberta Wheat Pool, Manitoba Pool Elevators and Saskatchewan Wheat Pool.

\*\* Exhibit WP-3, p. 16.

zero-cost debt.\* The railways, in their initial submission, made no reference to deferred taxes in the capital structure. Under cross-examination, however, Dr. Quirin agreed that, if working capital were treated properly, "(d)eferred taxes would then appear on the capital structure side"\*\* and should be treated as contingent equity:

THE COMMISSIONER: When you say it is contingent equity, you are saying that if the deferred taxes never have to be paid, then they in fact become equity?

DR. QUIRIN: Yes.

THE COMMISSIONER: If they have to be paid, then, it is a deduction from equity at that time?

DR QUIRIN: Yes. I think presumably that the contingency is reflected in the market process in the security price.\*\*\*

In computing the capital structure appropriate for CP Rail, this Commission deleted the amount of deferred income taxes shown on the liabilities statement of Canadian Pacific (Consolidated) Ltd. However, inasmuch as some of the assets used in transporting grain were or could have

---

\* Exhibit AMS-2, p. 61 and page AMS-P7.6; Exhibit AMS-17, p. 119 to 121; Transcript, Vol. 12, pp. 2258 to 2264 and Transcript, Vol. 35, pp. 6822 to 6827.

\*\* Transcript, Vol. 35, p. 6821.

\*\*\* Ibid., p. 6824.

been purchased from funds generated by deferred taxes, the application of the capital funds rate to the net book values of assets used in the transportation of grain will produce a capital funds cost attributable to the accrued deferred taxes. The effect of this is to accord to the deferred income taxes the weighted cost of funds rate of the remainder of the capital structure -- the fourth approach in our previous outline.

The treatment afforded deferred taxes causes a substantial change in the weighted average of capital funds costs. Table XVIII lists the results of including the deferred taxes as zero-cost debt. Note that, by comparison to the results shown in Table XVII, the weighted average before and after tax capital funds rates are both lower under this approach by 2.04<sup>\*</sup> and 1.11<sup>\*\*</sup> percentage points respectively -- a result which is not surprising when it is realized that all other capital funds rates are unchanged and that an additional 11 percent is added to the capital structure<sup>\*\*\*</sup> at a 0.0 percent capital funds rate.

---

\* 20.80% from Table XVII minus 18.76% from Table XVIII equals 2.04 percentage points.

\*\* 11.31% from Table XVII minus 10.20% from Table XVIII equals 1.11 percentage point.

\*\*\* \$4,508,626,000 from Table XVIII divided by \$4,062,789,000 from Table XVII minus 100.0 percent equals 11.0 percent.



TABLE XVIII

CP Limited Capital Structure and Capital Funds Rate  
Including Deferred Taxes as Debt at Zero Interest Rate

	Amount (000)	Percent	Cost Rate		Weighted Rate	
			After Tax	Before Tax*	After Tax	Before Tax*
Long-Term Debt	\$1,317,271	29.2%	6.75%	6.75%	1.97%	1.97%
4% Debentures	292,549	6.5	6.75	6.75	0.44	0.44
Deferred Taxes	445,837	9.9	0.00	0.00	0.00	0.00
Total Debt	2,055,657	45.6	XX	XX	2.41	2.41
Preferred Stock	36,103	0.8	7.34	15.40	0.06	0.12
Preference Stock	15,750	0.3	0.72	1.51	0.00	0.01
Common Stock	2,401,116	53.3	14.50	30.43	7.73	16.22
Total Equity	2,452,969	54.4	XXX	XXX	7.79	16.35
Total	<u>\$4,508,626</u>	<u>100.0%</u>			<u>10.20%</u>	<u>18.76%</u>

\*Tax Rate of 52.35%.

SOURCE: Exhibit CP-17 (Revised) and Commission's Calculations.

If the deferred taxes are treated as contingent equity as in Table XIX, the after tax capital funds rate of 11.64% is marginally higher than the 11.31% after tax rate when deferred taxes are excluded (Table XVII). However, the before

tax rate is markedly lower when deferred taxes are treated as contingent equity. This is because under this circumstance the before tax rate is properly achieved by "grossing up" the after tax rate by the effective tax rate of 38.93 percent rather than by the book tax rate of 52.35 percent which is proper when the deferred taxes are excluded. If, in the former instance, the effective tax rate is not utilized, the result would be that the deferred taxes would earn a pre-tax equity return as if those same taxes had, in fact, been paid. Failure to recognize this effect would introduce double counting.\*

---

\* Transcript, Vol. 35, pp. 6830 to 6833.

TABLE XIX

CP Limited Capital Structure and Capital Funds Rate with  
Deferred Taxes Added as Equity at 14.50% but  
Tax Rate Reduced to Effective Rate

	Amount (000)	Percent	Cost Rate		Weighted Rate	
			After Tax	Before Tax*	After Tax	Before Tax*
Long-Term Debt	\$1,317,271	29.2	XX	XX	XX	XX
4% Debentures	292,549	6.5	XX	XX	XX	XX
Total Debt	1,609,820	35.7%	6.75%	6.75%	2.41%	2.41%
Preferred Stock	36,103	0.8	7.34	12.02	0.06	0.10
Preference Stock	15,750	0.3	0.72	1.18	0.00	0.00
Common Stock	2,401,116	53.3	14.50	23.74	7.73	12.65
Deferred Taxes	445,837	9.9	14.50	23.74	1.44	2.35
Total Equity	2,898,806	64.3	XXX	XXX	9.23	15.10
Total	\$4,508,626	100.0%			11.64%	17.51%

\*Tax Rate of 38.93% based on taxes paid of \$155,472,000 on taxable income of \$399,322,000 per Exhibit CP-28 (Revised).

SOURCE: Exhibit CP-17 and Commission's Calculations.

### Working Capital

On Schedule 67 of their Annual Report to the Canadian Transport Commission (reproduced as Table XX, following page), the

## GENERAL

Canadian Pacific Limited

Year 1974

Railway

Rate of Return on Net Rail Investment

	Railway \$	Express \$	Commercial Communications \$	Highway Transport (Rail) \$	Total Rail \$
Property Investment - Rail					
Corporate Balance Sheet	2,583,849,120		150,630,607		2,734,479,727
Subsidiary Companies' Balance Sheets	67,407,417		-		67,407,417
Jointly Owned Companies	49,158,946		-		49,158,946
Other Investments - Rail					
Corporate Balance Sheet (excluding subsidiaries and jointly owned companies re- ported above)	-		-		
Insurance and Other Funds - Rail					
Corporate Balance Sheet	1,346,146		75,000		1,421,146
Working Capital	70,000,000		1,000,000		71,000,000
Adjustments (details)					
Donations and Grants					
Disallowed	( 56,400,064)		( 1,893,374)		( 58,293,438)
	2,715,361,565		149,812,233		2,865,173,798
Deduct					
Accrued Depreciation					
Corporate Balance Sheet	1,244,819,506		66,307,554		1,311,127,060
Subsidiary Companies' Balance Sheets					
Jointly Owned Companies	16,410,696		-		16,410,696
(Equalization Reserve portion applicable to Adjustments (details) Rail)	98,090,148		6,364,081		104,454,229
Excess User over					
Straight line Depreciation	( 51,194,503)				( 51,194,503)
	1,308,125,847		72,671,635		1,380,797,482
Net Rail Investment	1,407,235,718		77,140,598		1,484,376,316
Income before Fixed Charges (Schedule 11 of 66)	69,144,670		4,485,146		73,629,816
Rate of Return on Net Rail Investment					4.96%

Source: Annual Report of the Canadian Pacific Limited to the Railway Transport Committee of the Canadian Transport Commission and Statistics Canada, Ottawa. For the year ended December 31st, 1974, Schedule 67.

entry "Working Capital.... \$71,000,000"\* is added to the property investment prior to the deduction of accrued depreciation and other adjustments. Accordingly, the amount shown as "Net Rail Investment... \$1,484,376,316," which is the same figure as the total shown on Table XIV (Page 115), includes this \$71 million. This amount remains constant each year and does not reflect specific working capital requirements. However, as described at the outset of this chapter, the process of allocating debt and equity under the rate base-rate of return approach implicitly treats this amount as equity.

Of the \$71 million, \$70 million is indicated as the required or accepted working capital requirement for the railway operations. According to testimony of the Comptroller of Canadian Pacific Ltd., J.P.T. Clough:

Because CP Rail is operated as a division of CP Limited, the exact amount of its working capital cannot be determined. However, an amount of \$70,000,000 was developed as long ago as 1948,

---

\* Annual Report of the Canadian Pacific Limited to the Railway Transport Committee of the Canadian Transport Commission and Statistics Canada, Ottawa, For the year ended December 31st, 1974. Because of the inclusion of "Commercial Communications" under the Railway Act and Canadian Transport Commission jurisdiction, these amounts are included in the "Total Rail" amounts (note that the Commercial Communications represent less than 6 percent of all net rail investment).

on the basis of \$35,000,000 cash and \$35,000,000 material and supplies.

The then Board of Transport Commissioners for Canada, and their financial advisers, accepted the use of this figure. It has been used, unchanged, despite the substantial decrease in the value of the dollar, since then. If one relates working capital to total railway revenue of those years, a comparable working capital for 1974 would amount to at least some \$150,000,000.\*

According to the Provincial summary submission on Capital Costs:

There was never a study done to determine the appropriateness of this (70 million) figure. It is apparent from the financial statements of CP Ltd. that very much less than this amount appears as net working capital (current assets minus current liabilities) for the entire CP Ltd. (Consolidated) of which rail is only a part.... Other than rail's pro rata share of the nominal amount of working capital for all of CP Ltd. shown on the Consolidated Statements, no additional allowance for working capital for rail is justified.\*\*

This debate over the appropriateness of \$70 million or some other amount is somewhat academic, since the net values attributed to the assets used in the transportation of statutory grain used by the railways and the Provinces did not incorporate an allowance for working capital. That is, though the capital structure on which the average capital funds was determined included an allowance for

---

\* Exhibit CP-39, pp. 8-R-9 and 8-R-10.

\*\* Submission of the Provinces of Alberta, Manitoba and Saskatchewan on Capital Costs, pp. 4 and 5.



working capital, the total net asset base to which the capital funds rate was applied did not include a working capital allowance. This led to the railway position that the overstatement of costs resulting from the exclusion of deferred taxes in the capital structure was an offset to the understatement of costs resulting from the exclusion of working capital in the net book value asset base.

In point of fact, the allowance of \$70 million for working capital does not bear any relationship to the year end net working capital balances of Canadian Pacific Limited. Table XXI (following page) shows that, while inventories (half of the \$70 million allowance) have grown to nearly twice their original allowance, largely due to inflation, the total of working capital allowances has not kept pace. For 1974, the year end net working capital was only \$6 million (implying a negative cash working capital of \$63 million).

As stated in our Report, Volume I, the submissions before this Commission, the evidence of the data of Table XXI, and the information relating to the establishment of the original \$70 million allowance were inconclusive and did not support acceptance of either \$70 million or \$150 million for working capital in the capital structure. The determination of an appropriate working capital allowance therefore requires a detailed study of the lead and lag in cash flows.

TABLE XXI

Canadian Pacific Limited  
 Summary of Working Capital Position and  
 Inventory Balances (000,000)  
 December 31, 1956 to December 31, 1974

	Account 712 Materials and Supplies (Included in Current Assets Figure)	Current Assets	Current Liabilities	Net Working Capital
1956	\$44	\$228	\$111	\$117
1957	46	151	84	67
1958	45	173	88	85
1959	41	174	81	93
1960	38	181	79	102
1961	38	194	84	110
1962	38	212	93	119
1963	30	179	100	79
1964	32	161	116	45
1965	34	161	131	30
1966	40	201	202	( 1)
1967	40	195	138	57
1968	39	214	191	23
1969	42	207	160	47
1970	46	217	192	25
1971	44	269	216	53
1972	44	269	299	( 30)
1973	48	251	305	( 54)
1974	69	362	356	6

It is clear that working capital represents a necessary allocation of funds for the conduct of any business enterprise. Without specific knowledge of the cash flow requirements, we did not include an allowance for these in the investment base applicable to statutory grain. However, to illustrate the effect of including either \$70 or \$150 million as working capital, Table XXII was prepared. As shown therein, a \$70 million and \$150 million working capital allowance in the asset base would create a capital funds cost that is about 5 percent and 11 percent higher, respectively, than that which the Commission utilized.

TABLE XXII

Effect on Capital Funds Cost of Including Working Capital in CP Ltd.  
Capital Structure and Asset Base

Net Book Investment for CP Rail  
(excluding Commercial Communications) = \$1,407,235,718

(This amount includes an allowance for Working Capital of \$70,000,000)

Net Book Investment for CP Rail  
excluding Working Capital allowance = \$1,337,235,718

Effect of adding Working Capital allowance to Asset Base

i) \$70 Million Working Capital	$\frac{\$1,407,235,718}{1,337,235,718} = 1.05235$
---------------------------------	---

ii) \$150 Million Working Capital	$\frac{\$1,487,235,718}{1,337,235,718} = 1.11217$
-----------------------------------	---

Source: Annual Report of the Canadian Pacific Limited to the Railway Transport Committee of the Canadian Transport Commission and Statistics Canada, for the year ended December 31, 1974, Schedule 67.

## Offsetting Nature of Deferred Taxes and Working Capital Adjustments

Recall that earlier we recognized that the exclusion of deferred income taxes generally overstated the capital funds costs. We are now in a position to display the combined effects of that overstatement and the working capital

TABLE XXIII Effect of Combining Allowance for Deferred Taxes in Capital Structure and Allowance for Working Capital in Asset Base		
Case I: Deferred Taxes as Debt with Zero Interest Cost		
	After Tax Rate	Before Tax Rate
No Working Capital	10.20%	18.76%
Working Capital of \$70 Million	10.73	19.75
Working Capital of \$150 Million	11.34	20.88
Case II: Deferred Taxes as Equity at 14.50% and Reduced Tax Rate		
	After Tax Rate	Before Tax Rate
No Working Capital	11.64%	17.51%
Working Capital of \$70 Million	12.25	18.43
Working Capital of \$150 Million	12.95	19.47
SOURCE: Tables XVIII, XIX and XXII		

understatement referred to just above. By applying the two results shown on Table XXII to the results shown on Tables XVIII and XIX the "two offsetting errors" referred to in our Report, Volume I at page 88 (and footnote) become aparent. In fact, as shown on Table XXIII, when deferred taxes are treated as a zero-cost debt and allowance of \$150 million for working capital is included, the before and after tax capital funds rates are virtually identical to the rates of 20.8 and 11.31 percent utilized in the Commission's report.

While recognizing that none of the combinations shown as Table XXIII produce exactly the same before and after tax capital funds rates we have chosen for our cost computations, they indicate possible ranges in which that mythical "true" answer might fall. Nonetheless, we are confident that the capital funds rates we have chosen represent "the fairest way to deal with a very thorny problem." \* To have altered our calculations in any other way would have been to perform a judgmental analysis which could not be justified on the basis of the facts available to this Commission.

#### Pensions

Note 3 to the Consolidated Financial Statements of Canadian Pacific Limited relates to Pensions and states:

At December 31, 1975, there were unfunded liabilities, determined by acturial evaluations, of \$478,000,000 which is being funded by a series of equal annual payments ending in 1989 to 1992, and \$271,000,000 which is being funded by equal annual payments to 2027.

---

\* Report Volume I, p. 88.

Pension expense, including current service costs and payments on account of unfunded liabilities was \$105,000,000 in 1975 (1974 - \$82,000,000).\*

This note was appended to the financial statements, meaning that the unfunded liability would not appear with the liabilities of the balance sheet, in the same way that contingent liabilities for law suits are not segregated as separate liabilities. This unfunded pension liability is somewhat similar to the analysis of deferred taxes. The two approaches advocated in dealing with this amount were:

- include the full amount in the capital structure as debt with a cost rate equivalent to the rate of discount utilized in the actuarial computation of the liability
- exclude it, as a segregated amount, from the capital structure so that it acquires the same cost rate as common equity, de facto.

Because of the magnitude of this item, shifting it from one side to the other could have significant effects on the ultimate cost of funds rate. The Provincial position

---

\* Exhibit CP-17, p. 19. The cited passage is from the 1975 Annual Report, the exhibit presented before this Commission. The 1974 Annual Report contains a similar note. The unfunded liability in 1974 was \$426 million, and the current cost was \$82 million.



adhered to the view expressed by the first of the two approaches. According to their Summary Submission, the amount of the liability has been actuarially determined and there appears to be a legal obligation that Canadian Pacific Limited pay that amount. Asserting that this fund was not common equity, but debt with a cost rate equivalent to the actuarial discount rate, the Provinces recommended:

Evidence of the rate used was not available at the Orillia hearings but if this approach is used, the Commission should ascertain it for CP Ltd. and apply it to this amount. Of course there is no income tax applicable since these funds are actually debt which the corporation will pay out before arriving at its net income subject to income tax.\*

While stated clearly in summation, the Provincial position on this topic was not as clearly expressed under examination by the Commission.\*\* Equally, the position of the railways on this issue was somewhat clouded during that same examination but was restated clearly in their Summary Submission:

when account is taken of CP's substantial unfunded pension liabilities it is clear that the liabilities formally included in the balance sheet underestimate materially CP's long-term liabilities.

---

\* Submission of the Provinces of Alberta, Manitoba and Saskatchewan on Capital Costs, p. 3.

\*\* Transcript, Vol. 35, pp. 6780 to 6820.

It is also clear that CP's ability to raise additional debt is over-estimated by the conventional debt ratio. In addition, recognition of this liability invalidates the conventional measures of debt servicing ability to a greater extent in CP's case than in the case of U.S. railroads. Finally, recognition of the effect of this liability on future earnings does not invalidate Dr. Quirin's growth estimate.\*

From a review of the testimony, it is fairly clear that this obligation arises because of the impact of inflation on salaries, and pensions tied to those salaries. While it is now clear that the company has known future obligations, it does not now have to provide all of the funds determined by the actuarial examination. Because of this, the balance sheet of the company effectively understates the company's long term liabilities:

if that (the pension fund liability) were required tomorrow as it might well be by legislation to be funded somehow and funds had to be borrowed for that purpose one would find a debt ratio not of 30 percent or between 30 and 33 but between 50 and 53.\*\*

This was further supported by the response to the following question:

---

\* Summary and Final Argument of Canadian National and CP Rail, Cost of Capital Section, p. 26.

\*\* Transcript, Vol. 35, pp. 6779 and 6780 (Dr. Quirin speaking).

THE COMMISSIONER: But in fact does it not appear in the balance sheet of the company as assets purchased from retained earnings which would have gone to the pension plan if the thing had been kept on a proper keel?

DR. QUIRIN: There is in effect an overstatement of equity by that amount.\*

However, when asked if this would imply that the Commission should adjust the CTC approved capital structure for CP Rail to decrease the equity portion, Dr. Quirin responded:

I would rather not do that, sir. I think I would be inclined to take careful notice of it both from the point of view of what might happen to the bond ratings in terms of what additional debt raising capacity the company might have and so forth

...  
If I were to do that (shift the unfunded pension liability from equity to debt liability), I think I would attempt to ascertain what the effective real cost of that application is and it would be my contention that it is probably at least as great given the built-in biases of the system by which the thing is calculated the real cost is probably likely to be as great as the existing equity cost. This is why I would not bother doing it.\*\*

The railway position was further solidified when Dr. Quirin was asked if his sole reason for excluding the unfunded pension liability was because its cost rate would be about the same as the equity calculation:

---

\* Ibid., p. 6785.

\*\* Ibid., pp. 6785 and 6803.

DR. QUIRIN: No. My reason for not including it primarily is that it is not normal accounting practice to do from a starting point of view. It is something that acts as a restraint on future borrowing capacity and a great deal of other things. It is a warning, if you like, that there are greater obligations lying ahead.

If one were going to include it and one were satisfied that all of the actuarial assumptions were going to be met, then it might under very, very favourable circumstances -- I would have to look at what happened to the equity cost as a consequence of these manipulations -- it might be an appropriate number to use. However, there are some very peculiar kinds of regulations with respect to the assumptions that can be made. It is not permitted to assume an increase in future salary levels of more than 3 percent, for example, in making the actuarial projections. There are some other ones of a similar character with respect to mortality tables which operate perhaps the other way. There are some strange representations in the mortality tables which I do not think are important. In order to keep the funds solvent there are unrealistic assumptions about earnings rates frequently incorporated in the actuarial calculations so I would not without a very careful study of the entire basis of the thing just simply run out and adopt the assumed earnings rate.

The shortfall in past service obligations arises as I said because of inflation changing the salary levels and it cannot retroactively change the contributions of employer or employee. It also arises frequently even in a stable price environment because of labour negotiations which effectively impose upon the company a more beneficial pension plan. I would not regard those as being a company's generosity to its employees. I would regard those as the company paying the going price for labour to its employees just as much as their current wage rate represented the current labour. It may not have been done out of generosity 60 years ago. I think at the present time that is in recognition of the fact of the labour market.

I think without -- I don't -- without a very detailed explanation of all these things I would not want to specify what amount should be included on the balance sheet, nor what the rate of return should be on it. My instinctive reaction is I

would continue to leave that as equity. There is equity on the balance sheet. The equity is bought and paid for with due notice given to the fact that information is disclosed in the annual report and that is I think the basis on which it should continue to rest.\*

We have accepted the view that the capital structure relevant to the shareholders at issue in this investigation is that of Canadian Pacific Limited (Consolidated). Included in this capital structure is an amount of retained earnings/shareholders' equity which has arisen from an understatement of previous expenses -- the pension liability. At the same time, those shareholders are aware of the unfunded pension liability which the corporation will face in the future and have, presumably, adjusted their growth expectations and resulting cost of equity funds rate requirements. Also, the company, in generating capital funds in the recent past, has examined the options of debt and equity funding and the effective rates for each. Accordingly, we are of the opinion that this liability is implicitly included in the weighted cost of funds rate which we have adopted. If we were to shift the unfunded pension liability, we would have to reexamine the debt capacity and recent debt rates of the company. To do so would represent an impressive undertaking that would have taken us well beyond the

---

\* Ibid., pp. 6805 and 6806.



effort possible at this time. In the end, we were not convinced that the outcome of this would differ materially from the results as we have computed them.

In this, we must concur with Dr. Gordon's remark, that:

to look on this pension fund liability one would have to have a great deal of information, not only with regard to the nature of the commitments but the whole actuarial computations which are a very hairy operation.\*

#### Donations and Grants

With respect to donations and grants, the Provincial position was that they must be identified as a capital component whose cost rate was zero:

They were made with a view to ensuring that the shareholders of the Railway received a fair return on the investment they actually made. When the Railway was fully regulated, donations and grants were always excluded from the net investment base of the Canadian Pacific.\*\*

The railways agreed that, to the extent donations and grants are reflected or embedded in assets utilized in the transportation of grain by rail, they should be included as part of

---

\* Ibid., p. 6780.

\*\* Submission of the Provinces of Alberta, Manitoba and Saskatchewan on Capital Costs, pp. 3 and 4.



the capital structure but argued that they should have a capital funds rate similar to that of common equity:

DR. QUIRIN: I think as a matter of principle I would argue that they should be given the equity rate or some slightly smaller rate possibly.

THE COMMISSIONER: If they were given the equity rate should they also be grossed up for taxes?

DR. QUIRIN: That is a matter I have not actually thought about. I think by implication of things I have said elsewhere I think they should be grossed up for taxes.\*

However, as noted by Dr. Quirin, elsewhere, most if not all of these donations and grants have been excluded from the net investment base used to compute the capital funds cost of transporting grain by rail.\*\* Accordingly, it was appropriate to exclude them from the capital structure. CP Rail's 1974 Annual Report to the CTC shows that disallowed donations and grants represent about four percent of the net rail investment base -- hence our conclusion that the relative amounts of money involved had little net effect on the cost of funds rate.\*\*\*

---

\* Transcript, Vol. 35, pp. 6822 and 6823.

\*\* See, for example, the listing of CNR donations and grants Exhibit CN-14, p. 110.

\*\*\* Note that the \$58 million of donations and grants would only represent about one percent of the CP Limited (Consolidated) net investment.

We were unable to accept fully the position advanced by the Provinces regarding the purpose of the donations and grants. However, the fact that we have concluded that most assets arising from donations and grants have been excluded from the net asset base attributed to the transportation of statutory grain and that the impact of the remaining amounts would be insignificant\* leads us to conclude that leaving whatever remains as equity is quite acceptable.

#### Inert Assets

Along similar lines, the Provinces argued that the common equity account of CP Limited was inflated, to the extent that the investment base incorporated redundant or inert assets:

To the knowledge of AMS, no physical inventory has ever been made of railway property to determine the extent of inert or redundant assets in the system. Such a task would probably be impossible....The existence of assets in the system, not used and useful, should be recognized as being reflected in the common equity account and it should accordingly be reduced.\*\*

---

\* If no donations or grants were excluded, a shift of these dollars to zero cost debt would change the 11.31% to 11.11% and the 20.80% to 20.38%.

\*\* Submission of the Provinces of Alberta, Manitoba and Saskatchewan on Capital Costs, p. 4.

According to Dr. Gordon, the presence of inert assets

...is not a consideration of arriving at a cost rate. The cost rate is independent of whether the existing capital is efficient for the purpose or is excessive, but it certainly influences the determination of the capital costs in dollars.\*

As noted in the Provincial Summary Submission, this is not a new problem. In Reasons for Order No. R-6313, the Committee established, among others, the following guidelines:

The effect of inert assets in the Canadian Pacific net investment base is to inflate the equity portion of the railway's capital structure. Since equity normally requires a higher rate of return than debt -- particularly if income tax is included -- a return calculation using net book investment results in a rate which is higher than reasonable when applied to specific items of investment.\*\*

Within the scope of this Inquiry, we were not able to undertake a detailed analysis of all of the assets and their efficiencies within Canadian Pacific Limited. Even the reduced task of examining the capital efficiency of the assets employed in grain transportation by rail was beyond our capabilities. The one major exception to this was our exclusion of the unnecessary stations

---

\* Transcript, Vol. 35, pp. 6758 and 6759.

\*\* Reasons for Order No. R-6313, op. cit., p. 360.

on the grain dependent lines\* of Canadian National. Aside from this, we adopted the same approach as both the provinces and the railways:

(to) inherently assume that the employment of the capital is efficient.\*\*

To the extent that there may be inert assets in the asset base, we will have overstated the costs of transporting grain by rail by some unknown amount. However, we were aware of this potential problem and we have devoted some time to the identification of the costs associated with these assets. We conclude that the extent of the overstatement in grain transportation was not significant.

#### Premium on Preferred Stock

Premium on preferred stock arises from differences between historical par values and exchange par values and from discounts and premiums on the stock. The testimony of Mr. Clough dealt with this matter in some detail\*\*\* and was partly in response to a considerable amount of

---

\* Report, Volume I, pp. 119-121.

\*\* Transcript, Volume 35, p. 6761.

\*\*\* Exhibit CP-39, pp. 8-R-19 to 8-R-21.

discussion which took place during the Winnipeg hearings\* -- a discussion which centered around the difference in magnitude between the preference stock entry of CP Rail in its Annual Report to the CTC and the same entry for Canadian Pacific Limited (Consolidated) in its Annual Report to shareholders.

Basically, the Premium on Preference Stock has arisen from three sets of transactions:

- discounts and premiums on original issuance of 4% Non-Cumulative Preference Stock between 1893 and 1931.
- 1967 to 1969 conversion of sterling holdings to Canadian dollar holdings of preference stock created an excess of original par value, converted at \$4.86 2/3 to the pound, over the par value of the new stock, converted at \$3.00 to the pound sterling.
- 1971 to 1974 conversion of 4% Non-Cumulative Preference Stock (sterling and Canadian) to 7 1/4% Cumulative Redeemable Preferred Shares, Series A, par value \$10.00, created an excess of par value of preference stock over that of preferred shares.

The first of these represents a debit, the latter two credits, to the "Premium on Stock" account. However, these are not the only entries in that account. By far the largest component of the account is premium on ordinary stock

---

\* Transcript, Vol. 10, pp. 1748 to 1761.

(about \$78.8 million), though the discount on debenture stock (\$24.4 million) has a significant impact on the overall account.

In the analysis performed by the railways in computing the cost of capital, the premiums and discounts of preference, preferred and ordinary shares have been applied against their respective totals:

The cost rates for the various classes of capital were calculated on the effective net proceeds after addition of premium or deduction of discount. It would, of course, be possible to deem this premium part of the ordinary stockholders' equity, which is the effect of normal accounting practices, when making cost of capital calculations. The approach used is exceedingly conservative, in that it produces a lower cost of capital rate.\*

In their Summary Submission, the Provinces argued that premiums arose due to arbitrary par values and that they had no significance. Accordingly, they argued that all amounts paid, including premiums and discounts in respect of preferred stocks be treated as preferred. This was in accord with the approach adopted by the railways, though the Provinces' assertion that:

---

\* Exhibit CP-39, p. 8-R-21.



There is no economic or accounting justification for allocating the premium on preferred stock to the common equity account\*

indicates that they do not support Mr. Clough's claim that the approach achieves conservative results.

This Commission, in developing the appropriate capital structure for CP Ltd., adopted the Consolidated structure. The effect of this is to include the preference premiums in common equity. In this, we accepted the capital structure of CP Limited as contained in their Annual Report to Shareholders and accepted the "normal" accounting practices referenced by Mr. Clough. Note that if we had restated the premium on preference shares as preference stock and used the reduced capital funds rate of 0.75\*\* percent, our computed after tax rate would have been lowered from 11.31 percent to 11.11 percent and our computed before tax rate would correspondingly be reduced from 20.80 percent to 20.38 percent. If we had used the original 4 percent rate rather than the 0.75 percent rate, our computed after and before tax rates would have been 11.18 percent and 20.53 percent

---

\* Submission of the Provinces of Alberta, Manitoba and Saskatchewan on Capital Costs, p. 5.

\*\* The 0.75 percent cost rate for the preference stock is a reduction of the original 4.0 percent rate to reflect the reissue effects.

respectively.

We are satisfied that the procedure which we have adopted is satisfactory for the purpose of costing the movement of grain by rail. Whether the sale of a preference stock generates a discount or premium to the corporation will have been considered by the purchaser of the issue in accepting the coupon rate. However, when the company pays dividends, it will be on the par value and not on the purchase price. Additionally, when a premium is generated in the issue of the preference stock, it cannot generate returns to the preference shareholder, since his return is stated as a coupon rate on a par value. That premium is available and does generate a return which is available to the common equity shareholder and should be expected to earn a return comparable to all of the other funds available to the common equity shareholder. Conversely, when a discount is given on a preference stock issue, it deprives the common equity shareholder of funds which would have earned a return equal to the rate on common shareholders' equity.

For these reasons, we have adopted the procedure of allocating all premiums and discounts to a single account and including this with common equity, as is done on the CP Limited Consolidated Financial Statement.

## Capitalization of Leases

The final factor which could potentially influence the capital structure was the existence of noncapitalized leases. This issue was raised during the cross-examination of Dr. Quirin, when he was being questioned on the issue of debt coverage in comparison to U.S. railroads. In the course of a much longer response, he stated:

another factor that we have looked at and which again is taken into account is the extended (extent of?) capitalized rental obligations which are to some extent a substitute of debt and have to be taken into account again.\*

At the conclusion of this answer, one of the Provincial spokesmen continued:

MR. ROTHSTEIN: Arising out of that statement, Dr. Quirin, how have you treated leases in the construction of your capital structure for CP Rail?

DR. QUIRIN: I believe most are capitalized...

MR. ROTHSTEIN: To the extent that some leases were not capitalized you would be understating the debt ratio?

DR. QUIRIN: That is right and the same of course would apply to the U.S. railroads...\*\*

---

\* Transcript, Vol. 34, p. 6490; bracketed phrase is interpretation of apparent transcript error.

\*\* Ibid., p. 6491.

However, in a later clarifying comment, Dr. Quirin stated:

I do not think it is improper not to capitalize them, but I think for purposes of comparison with other companies their leases ought to be capitalized as well.\*

In the Annual Report to Shareholders, under the heading of Contingent Liabilities, Canadian Pacific Limited indicate commitments for rent for freight cars of about \$54 million and commitments under other long-term leases of approximately \$86 million. Some of these former leases are for short periods of time, and the latter are unrelated to CP Rail. The railway position was detailed in the following exchange:

THE COMMISSIONER: Is it CP Rail's position that only the \$19.5 million is properly included, is that correct?

MR. KNOX: Yes.

DR. QUIRIN: I believe that is the position.

THE COMMISSIONER: And that none of the \$86 million is properly included?

DR. QUIRIN: Yes.\*\*

The Provincial position on this matter was stated in their Summary Submission:

---

\* Ibid., p. 6495.

\*\* Transcript, Vol. 35, p. 6647.

Payments required under leases are long term obligations of the company. As such, these leases should be capitalized in arriving at the true capital structure....It should be noted however that the inclusion of leases in the capital structure will increase both long term debt and total long term investment in the firm, but the proportion of the total which is debt will be increased.\*

Late in the hearings, the Commissioner requested that Canadian Pacific provide additional information on leasing commitments. In a letter to the Commissioner,\*\* details of "financing" (or "capital") leases were provided which indicated that Canadian Pacific (Consolidated) Limited had lease commitments of \$139.5 million at December 31, 1974. Of this amount, \$63.7 million (46 percent) were financing leases; of that amount, \$19.5 million were associated with Canadian Pacific Limited and the remaining \$44.2 million with its subsidiaries (principally The Algoma Steel Corporation, Limited).

In computing the appropriate capital funds cost for this Commission, we did not make any specific adjustments for lease commitments which could have impacted on the capital structure. Had we included the above \$63.7 million as recent long-term debt, at, say, 10.57 percent,

---

\* Submission of the Provinces of Alberta, Manitoba and Saskatchewan on Capital Costs, page 5.

\*\* Letter of H. M. Romoff, August 10, 1976.

the effect would have been to decrease the after tax rate from 11.31 to 11.29 percent, and the before tax rate from 20.80 to 20.64 percent. Alternatively, if the entire amount of \$139.5 million had been included, the 11.31 would have been the same 11.29 percent and the 20.80 would have been slightly lower at 20.48 percent. Finally, if we had only included the financing leases of Canadian Pacific Limited (\$19.5 million), the rates of 11.31 and 20.80 percent would have changed to 11.30 and 20.75, respectively.

Clearly, the effects of these exclusions are not significant, even if one were convinced that their inclusion were appropriate. We agree that from the standpoint of costing, leased equipment should be treated in a manner similar to equipment owned by the railway. However, this is not achieved by converting outstanding lease commitments into balance sheet liabilities as suggested by the Provinces. Embodied in the lease commitment is the owner's trade-off between interest cost, purchase price and profit differentials.

An acceptable argument can be advanced for the inclusion of some capital components to reflect financial or capital leases in the capital structure used in computing the capital funds rate and capital funds cost. Having



done so, it would become necessary to include separate capital funds costs and depreciation costs for these items -- costs which may differ from averages of comparable equipment owned by the railway. Finally, the amount to be included and the appropriate cost of funds rate to apply against it may differ significantly from the recognized leasing commitment and the incremental borrowing rate of the company.

### Conclusion

Seven potential adjustments to the selected capital structure have been identified in this section. Each one, taken independently, would be expected to have only a minimal impact on the computed rates of 11.31 and 20.80 percent even if their fullest impact were expected. As noted in most of the cases, it is not clear that any of them would yield the fullest impact computed. Additionally, two of these factors were shown to have offsetting effects on the cost of funds rates of CP Limited, as computed.

No attempt has been made to rank, correlate or integrate the potential impacts of all of these adjusting factors on the chosen capital structure and cost of funds rates. We have explored their potential impacts but find that our chosen structure and rates are appropriate and need not be modified. In this, the Commission believes that it

has progressed to the most refined examination possible and in light of all these findings is still confident that the chosen structure and resulting capital funds rates are the most appropriate for the costing of the transportation of grain by rail under contemporary conditions.

## CHAPTER VI

### LONG TERM DEBT FUNDS RATE

In the preceding chapters, we have discussed various factors that influence the development of the average capital funds rate appropriate for CP Rail's transportation of statutory grain. This chapter and chapters VII and VIII set forth the positions of the various parties to the inquiry and our analysis and conclusions as to the capital funds rate for each of the primary sources of capital (i.e., debt, preferred equity, and common equity) used to purchase the railway owned assets employed in the transportation of statutory grain.

All parties and the Commission defined long-term debt as all noncallable debt not due within the year 1974; all debt with a term in excess of one year which was due within year 1974; and the perpetual 4% consolidated debenture stock not pledged as security for the Collateral Trust Bonds of Canadian Pacific Limited.

In their development of a cost rate for debt capital, the railways utilized the interest rates on the various debt instruments related to the capital employed in the rail operations. These rates ranged from 1.98 percent to 8.25

percent and represent the historical (or embedded) rates for each type or category of debt instrument. As shown on Table XXIV (following page), the weighting of the interest rates by the relative proportions of their associated debt yields an average interest rate of 4.96 percent referred to in Volume I of this Report.\*

The Provinces in their initial submission noted that either the average embedded interest rate on the debt of CP Limited of 6.75 (developed as shown in Table XXV,\*\* page 162) or the 4.96 percent used by the railways could be justified on certain grounds:

The case for using the CP Limited embedded rate is that particular debt instruments should not be attached to particular assets. On the other hand, much of the low-cost debt in the CP Limited capital structure was a direct consequence of CP Rail. A pragmatic solution to the problem is to take a simple average of the two embedded rates, and that was done.\*\*\*

---

\* Due to typographical error, this is incorrectly reported as 4.99 percent at page 90 of the Report.

\*\* The long-term debt of Algoma Steel Corporation (a CP Ltd. subsidiary) was not included in the development of the embedded interest rate applicable to the long-term debt of CP Limited (Consolidated) because it was not incurred until mid-year 1974.

\*\*\* Exhibit AMS-2, p. 68.

TABLE XXIV

Canadian Pacific Ltd.  
Embedded Cost of Debt Capital Employed  
in the Rail Enterprise

Debt Capital	Aggregate Amount At Dec. 31/74 (\$000,000)	Percent of Total	Cost Rate
Equipment Trust Certificates	\$ 79.59	17.87%	7.55%
Leased Line Securities Not Owned			
Sterling	44.00	9.88	2.05
U.S.	0.05	0.01	5.85
Canadian	23.36	5.25	7.94
Collateral Trust Bonds	98.80	22.19	7.59
Bank Loans	15.00	3.37	8.25
Perpetual 4% Consolidated Debenture Stock			
Sterling	148.59	33.37	1.98
U.S.	<u>35.91</u>	<u>8.06</u>	<u>4.93</u>
Total Debt	\$445.30	100.00%	4.96%

Source: Exhibit R-4, p. 57.

TABLE XXV		
CP Limited		
Embedded Cost of Debt for Year 1974		
	As at December 31	
	1973 (\$000,000)	1974 (\$000,000)
Long-term Debt	\$ 819.4	\$1,196.0
Plus Long-term Debt Due within Current Year	168.0	121.3
Plus 4% Consolidated Debentures	292.6	292.6
Less Algoma Steel Debt	<u>-</u>	<u>168.7</u>
Computed Long-term Debt	\$1,280.0	\$1,441.2
Average Long-term Debt	\$1,360.6	
1974 Interest paid on this Debt	91.88	
Embedded Interest Rate	6.75%	
Source: Exhibit AMS-2, page AMS-P7.5; <u>Annual Report to Shareholders</u> , CP Ltd., 1974.		

The outcome of this "pragmatic solution" is a rate of 5.8 percent which was used for the Provincial calculation of the weighted capital funds rate.



With reference to their submitted capital funds rate calculations, the railways noted:

It must be recognized that this average figure is as low as it is only because of the inclusion of embedded debt and preferred share equity costs which are significantly below current cost levels. Any addition to present capitalization . . . would involve significantly higher costs.\*

According to the railway submission, an appropriate current cost of debt would be 10.7 percent.\*\* Substituting this percentage for the embedded rates of Equipment Trust Certificates, Collateral Trust Bonds and Bank Loans\*\*\* shown on Table XXIV yields a weighted cost rate of 6.30 percent for debt capital.

The Commission rejected the railways' use of the specific interest rates of historical debt instruments even

---

\* Exhibit R-4, p. 47.

\*\* As submitted to the CTC by Canadian Pacific in May 1975, the current cost of debt was calculated as the composite cost of their latest bond issue (Collateral Trust Bonds dated December, 1974) at 10.57 percent.

\*\*\* Since the Leased Line Securities not owned and the Perpetual 4% Consolidated Debenture Stock have no maturity dates, then the opportunity cost rate will continue to be the embedded rate.

though they were supposedly identifiable with the existence of the basic railway operation (going back to its nineteenth century inception). Consistent with our reasons for adopting the capital structure of CP Limited (Consolidated), as being appropriate for grain traffic, the Commission accepted the view that the debt of subsidiaries and divisions of CP Limited is not entirely independent of the debt and debt structure of the parent company. This is evidenced by the fact that CP Limited operates according to centralized cash management and consolidates the capital activities of its divisions and subsidiaries.\*

Under these circumstances this Commission views the generation of funds for the purchase of assets for all CP Limited companies as part of an optimizing process undertaken by the management of CP Limited (Consolidated). We have said elsewhere that the only capital structure which was logical and consistent for our purposes was that of CP Limited (Consolidated). To depart from that structure and the component capital cost rates of that structure would be

---

\* Transcript, Vol. 34, pp. 6457-6458: "...well, first of all there is some degree of consolidated cash management in which the cash resources are pooled in effect as a day-to-day loan of that cash. Some subsidiaries are financial subsidiaries and do raise debt with the knowledge of the lenders that it will be used for CP Corporate purposes."

to deny the significance of capital structure and to adopt rates which are representative of only a part of that structure. Logic and consistency required the adoption of the 6.75 percent rate.



## CHAPTER VII

### PREFERRED EQUITY FUNDS RATE

Included in the Shareholders' Equity portion of the Consolidated Balance Sheet of Canadian Pacific Limited are two entries:

- Preferred Shares

Authorized -- 23,655,139 shares of a par value of \$10 each

Issued -- 3,610,256 7-1/4% Cumulative Redeemable Series A shares

- Preferred Stock -- 4% Non-Cumulative

Authorized--an amount not exceeding one-half the aggregate amount of Ordinary Stock outstanding

Issued - (sterling) 865,319 in amounts of (sterling) 1 and multiples thereof

- in amounts of \$3 and multiples thereof

The first of these accounts for \$36,103,000 and the second \$15,750,000 (\$4,211,000 in sterling and \$11,539,000 in dollars). In total, they represent less than one percent of all liabilities of CP Limited (Consolidated) -- including current liabilities. The actual stipulated or nominal yield

rates affixed to the securities at the time of issuance, as submitted by Canadian Pacific to the Canadian Transport Commission, was 7.34 percent for preferred shares and 0.72 percent (based on 0.19 percent on stock issued in sterling and 1.41 percent on stock issued in Canadian dollars) for the preference stock. The railways, in their submission, adopted these rates and attached relative weights of 2.40 percent and 5.07 percent to the preferred and preference shares respectively (see Table XXVI).

The Provinces, in their submission, used a rate of 2.83 percent for the "preferred" entry in their capital structure. The Provincial reference to preferred stock encompassed both preferred and preference shares and was based on the weighted average rate of 2.85 percent.\*

---

\* This slight difference (i.e. 2.83% vs. 2.85%) would not have affected the estimated capital funds rate submitted by the Provinces.



TABLE XXVI		
Provincial Development of the Weighted Average Capital Funds Rate for Preferred Stock		
	Percent	Cost Rate
Preference - :	2.87%	0.19%
- \$:	2.20	1.41
Preferred :	<u>2.40</u>	<u>7.34</u>
Total Preferred	7.47%	2.85%
Source: Exhibit R-4, page 57.		

With respect to the cost rates on preferred and preference stock there was no disagreement.\* These component cost rates were used by this Commission and weighted by the 0.9 and 0.4 percent that each contributes to the capital structure adopted by this Commission (see Table XVII).

---

\* The effect of changes in par values, if traced through to the effective rates, including any reissued stock (see Exhibit AMS-17, p. 118), might result in a change in the overall capital funds rate of about one-hundredth of one percent.



## CHAPTER VIII

### COMMON EQUITY FUNDS RATE

The extended debate before this Commission over the appropriate capital funds rate for common equity capital and the concern over small differences in the rate (i.e., one-half of one percent) might lead the casual observer to conclude that a lot of time and effort was expended in the pursuit of excessive accuracy. However, when translated into potential dollar impact, the cause of such concern becomes apparent -- a change of 0.5 percentage points in the before tax<sup>\*</sup> equity funds rate could cause a change of plus or minus approximately 2.0 million dollars in the combined total cost incurred by both railways in the transportation of statutory grain.

The derivation of the appropriate equity rate involved the consideration of many factors of differing degrees of relevance and significance to this Commission in its final determination of the appropriate capital funds rate. To

---

\* The before tax equity funds rate includes an allowance for Federal income taxes and, given the asset base, effectively identifies the gross earnings the enterprise requires in order to adequately compensate its common equity shareholders and pay the required Federal income taxes.

present, in an orderly fashion, the considerable volume of material we received relating to the common equity capital funds rate, the discussion has been separated into seven main subsections. The first of these presents some background on the process followed by the Canadian Transport Commission in determining the approved equity funds rate for CP Rail. The second gives a brief description of the year 1974 financial results for CP Limited and CP Rail so that later analyses may be viewed within this historical context. The third subsection contains a generalized discussion of the methodologies employed in evaluating the appropriate equity funds rate and the fourth sets forth this Commission's general evaluation of the various methodological techniques. The fifth subsection is a detailed discussion of the significance of and the measurement of the growth in value of the stock of CP Limited. The sixth subsection contains a detailed examination of each of the specific procedures and tests contained in the various submissions of the parties to this Commission and our findings as to the relative weight given each procedure by this Commission in its determination of the appropriate capital funds rate. The final subsection contains a summary of the extensive evidence on this topic presented to this Commission and of our findings.

## Canadian Transport Commission Procedures

For 1974, the Railway Transport Committee of the CTC determined that a capital funds rate of 8.90 percent was appropriate for determining the costs incurred by CP Rail under Sections 253, 256, 258, 260 and 261 of the Railway Act. For Sections 264, 272, 276 and 278 the approved rate was 17.04 percent.\* In approving these capital funds rates, the Committee accepted a debt funds rate of 4.96 percent and a preference stock funds rate of 2.85 percent as claimed by CP Rail in their submission to the CTC. The CTC also determined that a before tax common equity funds rate of 11.5 percent was appropriate.

The methodology supporting these calculations is generally defined by the guidelines in Reasons for Order No. R-6313 and the Railway Act (see Chapter II for a fuller discussion of each of these) and relies on the rate base-rate of return method identified in Reasons for Order

---

\* Letter of J. d'Avignon, Secretary, Railway Transport Committee, to railway companies subject to CTC jurisdiction, September 18, 1975. The difference between the two rates is caused by the fact that the first mentioned sections of the Railway Act provide that the capital funds rate and, hence, the capital funds cost does not include an allowance for income taxes, whereas the second mentioned sections provide that the capital funds rate does include an allowance for income taxes.

No. R-6313.\*

In their submission to the CTC regarding the appropriate rate for 1974, CP Rail claimed that the equity funds rate should be 12.10 percent. This was derived by adding an allowance for the relatively greater risk associated with equity funds to the composite current (1974) cost of debt (i.e., the latest Collateral Trust Bond). Such a procedure was in accordance with and restricted by the guidelines of Reasons for Order No. R-6313.

According to evidence submitted to the CTC by CP Rail, the 20-year Collateral Trust Bond issued on December 1, 1974, by CP Limited, including all brokerage and issuance costs, produced an effective rate of 10.57 percent. With the allowance of 1.5 percent to compensate shareholders for the relatively greater risk associated with equity financing, CP Rail submitted a capital funds rate on equity capital of 12.10 (12.07 rounded to 12.10) percent. The Railway Transport Committee reduced the submitted common equity funds rate to 11.5 percent. While not specifically stated, this reduction may be related to a reduction in

---

\* Reasons for Order No. R-6313, p. 356.



the risk allowance from 1.5 to 1.0 percent and/or to a non-acceptance of the 10.6 percent estimate of current long-term debt costs. In setting the approved rate, CTC had the benefit of being able to evaluate the rate in the light of the August 15, 1974 decision of the Telecommunications Committee\* on this matter.

Canadian Pacific Limited --  
1974 Financial Results

As indicated earlier, year 1974 was chosen by this Commission as the base year of its Inquiry and CP Limited

---

\* Report of the Telecommunications Committee, Decision, VII, Rate of Return, p. 42:

"There can be no doubt that because of the marked increase in interest rates, because investors are appraising common stock values in terms of continuing inflationary trends and because of other factors that influence stock prices, the cost of common equities in general are higher today than they were in 1972. Based on the capital structure as it was estimated to be at the time of the 1972 Decision, the rates of return on total average capital of 7.8% and 8.2% then used as a base allowed for a range of rate of return on common equity of between 9.5% and 10.4%. We no longer find this range to be appropriate in conditions prevailing today.

Having considered all the evidence before us and all the information available to us, we find that a just and reasonable rate of common equity to Bell, at this time, is from 11.0 to 12.0%."

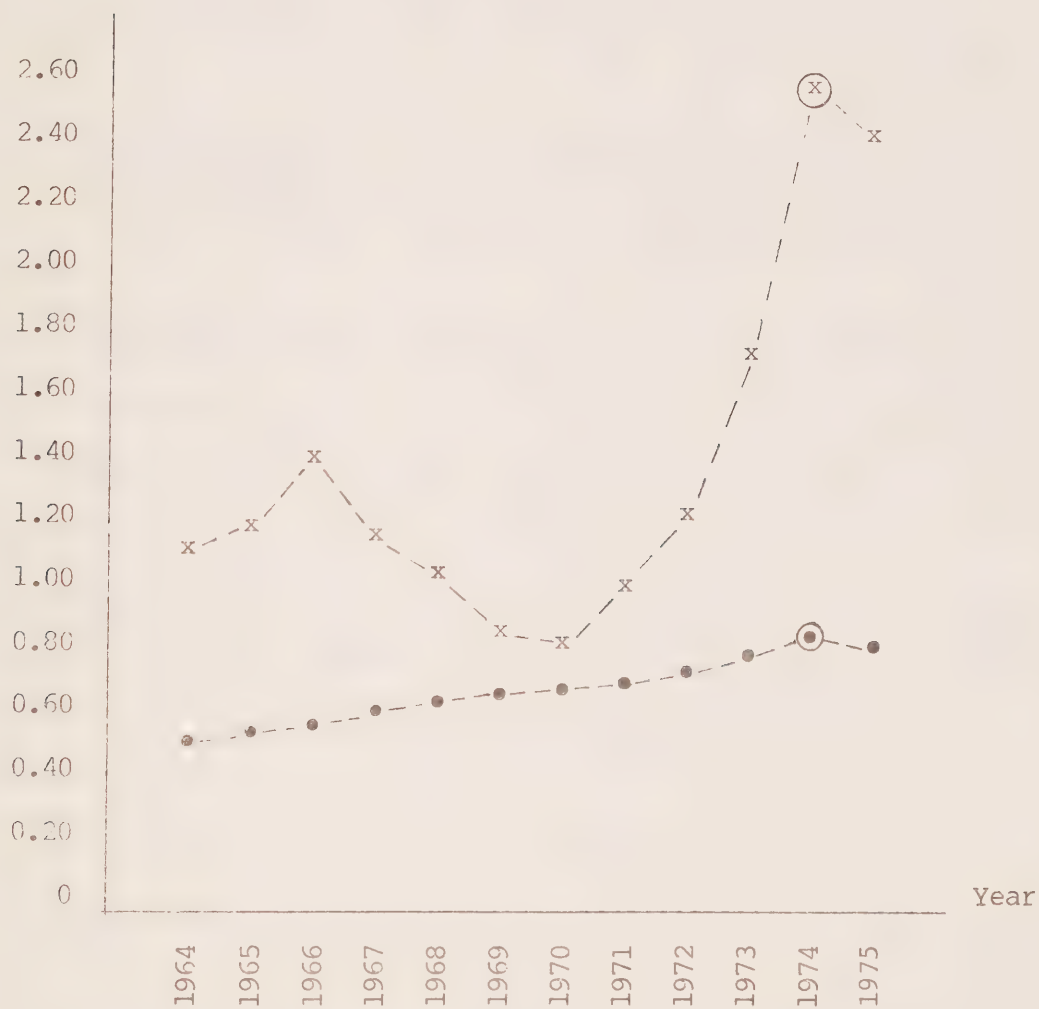
(Consolidated) was chosen as the most appropriate vehicle for examining the cost of capital funds. Quite naturally, then, this Commission would likely be induced to develop the best estimate of CP Limited's common equity capital funds rate for use in its determination of costs. Though we ultimately did develop an estimate of the 1974 cost of equity funds for CP Limited, we did not do so through a simple examination of the absolute or relative level of its 1974 earnings, of its dividends of that year, nor of its growth in earnings from 1973 through 1974.

As evident from the earnings and dividends per share for the period 1964 through 1975 depicted on Figure III (following page), the year 1974 (the circled x) appeared somewhat anomalous. Though the results of that year may not be inconsistent with some longer term trend or cycle, the actual performance of the company in 1974 when compared to both 1973 and 1975 was atypical. In the same fashion, one can see that taking the simple results of year 1966 (if one were to do a cost study on that base year) would not be representative of what went before or what ultimately followed. In fact, the level of earnings per share for 1966 was not repeated again until 1973. In viewing such estimates of growth, the Provincial rebuttal submission contained this warning:

FIGURE III

Canadian Pacific Limited Earnings and Dividends Per Share  
Each Year 1964-1975 (After Extraordinary Items)

CP Ltd.  
 Dollars  
 Per Share



LEGEND

x = Earnings Per Share

• = Dividends Per Share

Source: Exhibit R-4, page 60 and Exhibit AMS-17, page 139.

It would be a very foolish set of stockholders who, looking at the past record, used simply 1973-1974 growth in the dividend of 11.4 percent or for that matter 1974-1975 growth rate of -- 17.9 (sic) percent as an estimate of long-term growth.\*

During cross-examination, Dr. Quirin made a similar observation:

(it) is the long-term rate of growth you are trying to estimate and not the happenstance of a particular year... What we are looking at is a future growth.\*\*

The data for Canadian Pacific Limited (Consolidated) contained in Table XXVII (following page) shows the net income of CP Limited was more than 55 percent higher in 1974 than the previous year and more than 11 percent higher than the subsequent year. For CP Rail, net income in 1974 was more than 26 percent higher than 1973\*\*\* and more than 40 percent higher than 1975.

---

\* Exhibit AMS-17, p. 127.

\*\* Transcript, Vol. 10, p. 1827.

\*\*\* One of the apparent reasons for this was the 1974 recovery after the rotating national railway labour strikes in the late summer and fall of 1973.

TABLE XXVII

Canadian Pacific Limited (Consolidated)  
General Financial Characteristics

	1971	1972	1973	1974	1975
CP Ltd. Net Income (\$000,000)	\$81.3	97.1	125.0	194.4	174.9
- Per Share (\$)	\$ 1.09	1.30	1.69	2.67	2.40
- % Growth Per Share	-	19.3	30.0	58.0	( 10.1 )
CP Rail Net Income (\$000,000)	\$32.3*	39.1*	35.2*	44.6*	31.7
- % Growth	-	21.1	(10.0 )	26.7	( 28.9 )
CP Ltd. Dividends (\$)	\$ 0.66	0.70	0.77	0.86	0.845
- % Growth	-	6.1	10.0	11.7	( 1.7 )
Avg. Market Price (TSE) (\$) (Average of High & Low)	\$12.75	15.31	16.63	14.13	14.88

\*Restated for accrual basis for loss compensation.

Source: Exhibit CP-17.

Payments received under the National Transportation Act by CP Rail in 1974 were more than 2 1/2 times those received in 1973 and more than 50 percent above those received in 1972. For CP Trucks, the net losses in 1974 were one-thirtieth of the 1973 losses; for CP Ships, the 1974 net income (\$18.6 million) was about six times the 1973 level and at least three times the level of any of the previous three years; for CP Investments Ltd. (constituting

more than 60 percent of the CP Limited net income) the 1974 net income of \$114.2 million was more than 78 percent higher than the 1973 level and almost equivalent to the total net income of the three previous years combined (in fact, the 1974 net income of CP Investments Ltd. was greater than the consolidated net income of CP Ltd. from 1973). To complete the picture, we also need to note that the net income of CP Telecommunications and CP Air in 1974 were each about one-half their 1973 levels and both fell below the respective averages of the previous three years.

Before proceeding to the generic discussion of the methodologies used in the estimation of a common equity funds rate, we must state clearly that the apparent peculiarity of the company's 1974 performance does not lead to the rejection of the data for that year. Rather, it simply necessitates that the financial indicators for that year be viewed in the broader perspective of the recent past. The manner in which trends, averages and weightings have been used is discussed in the later section of this chapter.

#### Methodological Approaches

Four basic techniques or approaches were utilized to determine an appropriate capital funds rate for common equity. Without commenting on the strengths or weaknesses



of any of these in this section, we have summarized the basic conceptual framework employed by each.

#### Discounted Cash Flow

Though the capital cost experts differed on the adjustments that might be appropriate to its use and the estimates of the values for its computations, they both agreed that the Discounted Cash Flow (DCF) method is acceptable for determining the cost of common equity capital invested in assets used in the transportation of statutory grain.

THE COMMISSIONER: Do you both agree that the discounted cash flow model is an accepted and appropriate predictor of the capital attraction rate for equity capital?

DR. GORDON: Where that model could be used it is accepted, it is appropriate and I would say the best method for a firm.

THE COMMISSIONER: Dr. Quirin?

DR. QUIRIN: I agree that it is appropriate.

THE COMMISSIONER: Is it appropriate for the purposes of this Commission?

DR. GORDON: The Commission has a problem, unfortunately, in that it cannot be directly applied at the cost of capital for carrying grain or more precisely, the cost of equity capital. It can be used in arriving at the cost of equity capital for CP Limited on a consolidated basis and once we have arrived at that figure we then have to use other procedures to either raise it or lower it on the basis of the differences in risk that may exist between CP Consolidated and CP Rail.

THE COMMISSIONER: Dr. Quirin?

DR. QUIRIN: It is appropriate in the circumstances as a starting point and it is my view that only if there is a demonstrable difference in risk should the rate arrived at in that fashion be tampered with.\*

The DCF formula rests on the relationship between future dividends and present share prices. Specifically, it states that the share's current price will be equal to the sum of all future dividends (literally to infinity) discounted by a rate equal to the existing or potential shareholders' required return:

$$P_0 = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \dots + \frac{D_t}{(1+k)^t} + \dots \quad (\text{Eq. 8})$$

where

$P_0$  = share's current price (i.e., in period 0)

$D_t$  = dividend in period  $t$ ; and

$k$  = required return of shareholders

When the simplifying, but "widely accepted" assumption that future dividends are expected to grow at a constant rate 'g' is introduced, then

$$P_0 = \frac{D_1}{(1+k)} + \frac{D_1(1+g)}{(1+k)^2} + \frac{D_1(1+g)^2}{(1+k)^3} + \dots \quad (\text{Eq. 9})$$

---

\* Transcript, Vol. 35, pp. 6676 and 6677.

This infinite series can be restated as:

$$P_o = \frac{D_1}{k - g} \quad (\text{Eq. 10})$$

The cost of funds  $k$  can then be restated as:

$$k = \frac{D}{P_o} + g \quad (\text{Eq. 11})$$

This approach to the development of a capital funds rate decomposes that rate into two parts. The first is the current dividend yield, the second is the estimate of the long run growth in returns (dividends) as perceived by the current and potential investors in the company's stock. The dividend yield is an observable rate and is measured as the ratio of dividends in the current year to the average price of the stock for the same period. The anticipated growth of the company's stock must be inferred from available information on past performance and extrapolated trends. Only three general techniques of estimating future growth were advanced by the parties to this Inquiry; they were:

- brokerage estimates of future dividend growth;
- past growth in earnings or dividends;
- anticipated growth derived from the reinvestment of undistributed earnings; this is based on the results of the product of the fraction of earnings reinvested annually (' $b$ ,' the retention rate) and the rate of return (' $r$ ') which investors expect will be earned on the retained earnings (i.e.,  $g = br$ ).

The use of brokerage or investment service estimates of 'g' formed part of the testimony of Mr. Pitblado (Exhibit R-3). As discussed later in the empirical section, the Provincial experts criticized such an estimate since it represented "an averaging of the optimistic segment of the investment community and would represent an overestimate of growth."\*

In using past earnings or dividend growth, the parties examined the simple oneyear growth in dividends and ten year weighted and unweighted growth in earnings. In using the 'br' estimate of 'g,' the parties used a one, three or five year trend in return on book equity, the ten year average retention ratio and the four year incremental return on new investments. Note that the 'br' estimate of 'g' will be appropriate when new equity issues are not a major source of growth for the company or when the book and market values of the company's stocks are equal. The railway submission contained the following note on this relationship:

While the important role of br is to forecast the rate of growth in the dividend, it should be noted that in the theoretical model from which the formula is derived, br is also the rate of growth in earnings, in net assets per share and in book value per share.\*\*

---

\* Exhibit AMS-17, p. 125.

\*\* Exhibit R-4, pp. 32 and 33.

### Earnings Price Ratio

Both the Provinces and the railways agreed that under certain circumstances the DCF formula could be modified or simplified so that the earnings per share related to that share's market price (the earnings price or E/P ratio) could be used to estimate the capital funds rate directly. In their rebuttal submission, the Provinces described the conditions under which the capital funds rate was the E/P ratio:

(1) the firm pays all earnings as dividends and makes no investments or (2) the firm earns an average return on new investment exactly equal to its cost of funds.\*

However, the Provinces' submission cautioned that the latter condition held only when either regulatory or market competitive forces equated the allowed or required rate of return with the cost of funds for the company:

In all other cases the earnings price ratio is a biased estimate of the cost of funds.\*\*

Further, the Provincial experts contended that estimating the bias was only a rough application of the DCF formula

---

\* Exhibit AMS-17, p. 129.

\*\* Ibid.

and that the only appropriate procedure of checking to see if the bias was correctly estimated was to estimate the cost of funds in the absence of the bias and verify this against the estimates derived from DCF procedures.\*

The original cost of capital submission by the railways (Exhibit R-4) elaborated on the conditions in which E/P may be used as representative of the capital funds rate. The development of this argument has been summarized in the following pages.

In the case of a regulated company, the normal DCF formula (Eq. 11) may be rewritten:

$$k = \frac{D}{P} + g = \frac{D}{P} + br \quad (\text{Eq. 12})$$

where the return on investment 'r' is controlled and expected to equal 'k,' the cost of capital. Here, the rewritten cost of capital relationship, with 'k' substituted for 'r':

$$k = \frac{D}{P} + bk \quad (\text{Eq. 13})$$

may be simplified to:

---

\* Exhibit AMS-17, p. 132, "The previous observations only illustrate the pitfalls in attempting to derive the cost of equity capital from earnings price ratio data."



$$k = \frac{D}{P(1-b)} \quad (\text{Eq. 14})$$

Since D, the dividend, will be equal to that portion of the company's earnings E, which is not retained (i.e., (1-b)) and since b is the fraction of earnings which are retained, then

$$k = \frac{E(1-b)}{P(1-b)} = \frac{E}{P} \quad (\text{Eq. 15})$$

Where the competitive market forces in which a company operates hold the company's return on investment 'r' equal to its cost of capital 'k,' this analysis will hold true. The later section on empirical results details some of the argument which was presented on this topic. In a regulatory environment with no regulatory lag, when the regulator sets the allowed rate of return equal to the cost of funds, then E/P may be used as an estimation of the cost of capital.

The railway submission then went on to elaborate on the nature of the bias that the E/P ratio may yield as an estimator of the cost of capital. When the profitability of the company may be beneficially influenced by a market situation (restricted competition, technological advance, etc.) then investors will have reason to believe that the the return on investment, 'r,' will be systematically

greater than the cost of capital, 'k.' If the amount of the excess of the return on investment over the cost of capital is 'm,' then we may write:  $r = k + m$  and the DCF formula (Eq. 5) may be rewritten by substituting for 'r':

$$k = \frac{D}{P} + b(k + m) = \frac{D}{P} + bk + bm \quad (\text{Eq. 16})$$

which simplifies in the following manner:

$$(1 - b)k = \frac{D}{P} + bm$$

$$k = \frac{D}{P(1 - b)} + \frac{bm}{(1 - b)} \quad (\text{Eq. 17})$$

Recalling that  $D = E(1-b)$ , we may further simplify equation 17 to read:

$$k = \frac{E(1 - b)}{P(1 - b)} + \frac{bm}{(1 - b)}$$

$$k = \frac{E}{P} + \frac{bm}{(1-b)} \quad (\text{Eq. 18})$$

To summarize, the analysis to this point has shown that, where the company's cost of capital and its rate of return on investment are equal, then  $E/P$  is an adequate estimator of  $k$  (the cost of capital). Where investors systematically believe that the rate of return on investment will exceed the cost of capital by a rate 'm,' then  $E/P$  as an estimator of the cost of capital will be biased downward. The amount of this understatement will be equal to the "excess" rate of return over the

cost of capital times the fraction of company earnings which are retained for reinvestment divided by the fraction of company earnings which are distributed as dividends. As an example, if the company's cost of funds rate was 12 percent and its actual rate of return was 15 percent, then if it normally distributed 40 percent of its earnings, the E/P ratio would understate the cost of funds rate by 4.5 percentage points.

The railway submission also analyzed the situation in which a large portion of the capital invested by a company is in unregulated activities which are subject to competition, while a smaller portion is invested in activities which are unprofitable but are required due to regulatory constraints against discontinuance. Such was the case for CP Limited in 1974. For the analysis of the bias inherent in using the overall E/P ratio in this case, the fraction of retained earnings invested in the unprofitable regulated activities was denoted as 'c,' with the investment in unregulated activities being  $(1-c)$  times the retained earnings. Earnings in the unregulated sector are expected to generate a rate of return on investment equal to the cost of funds rate 'k' or to exceed that rate by an amount 'm' ( $r = k + m$ ). Earnings expectations for the unprofitable regulated

portion are less than 'k,' the cost of capital, by an amount 'e,' so  $r = k - e$ .

Where the rate of return on unregulated activities is just equal to the cost of capital ( $r = k$ ) and the return on the unregulated activities is less than 'k' ( $r = k - e$ ), then the net return of the company 'r' will be made up of the return on the unregulated activities 'k' times the fraction of retained earnings  $(1-c)$  invested in those activities plus the return on regulated unprofitable activities 'k - e' times the fraction of retained earnings ('c') invested in those activities. In this case, the DCF formula (Eq. 12) may be rewritten:

$$\begin{aligned}
 k &= \frac{D}{P} + b [k(1 - c) + (k - e)c] \\
 k &= \frac{D}{P} + bk - bkc + bkc - bce \\
 k &= \frac{D}{P} + bk - bce
 \end{aligned}
 \tag{Eq. 19}$$

This may be simplified, using the known relationship of  $D = E(1 - b)$ :

$$\begin{aligned}
 (1 - b)k &= \frac{E(1 - b)}{P} - bce \\
 k &= \frac{E}{P} - \frac{bce}{(1 - b)}
 \end{aligned}
 \tag{Eq. 20}$$

Under these conditions, the overall company cost of capital will be less than the E/P ratio by an amount attributable to the shortfall in rate of return in the unprofitable regulated sector tempered by the fraction of retained earnings invested in that sector.

Where the rate of return on unregulated activities is greater than the cost of capital ( $r = k + m$ ), then we re-write (Eq. 12) as:

$$k = \frac{D}{P} + b [(k + m)(1 - c) + (k - e)c]$$

$$k = \frac{D}{P} + bk - bkc + bm - bmc + bkc - bce$$

$$k = \frac{D}{P} + bk + bm - bmc - bce$$

$$(1 - b)k = \frac{E(1 - b)}{P} + bm - bmc - bce$$

$$k = \frac{E}{P} - \frac{bce}{(1 - b)} + \frac{bm(1 - c)^*}{(1 - b)} \quad (\text{Eq. 21})$$

That is, to the extent that earnings in the unregulated activities exceed the cost of capital, then they will offset the reduction due to the unprofitable regulated activities. This leads the railways to conclude:

---

\* Exhibit R-4, p. 40.

Accordingly, expression (66) (our Eq. 20) which includes an adjustment for possible downward bias in E/P, provides a lower-bound estimate for k.\*

Though these last statements and equations may appear mathematically obvious, the manner in which they were ultimately utilized may not be so clear. The Provinces did not utilize these equations, but adhered to their former contention that the proper approach was to estimate 'k' directly, rather than trying to adjust E/P. The railways, on the other hand, estimated 'c' and 'e' (since 'b' was historically known) and from that adjusted E/P downwards to obtain the "lower bound estimate" referenced above.

#### Capital Asset Pricing Model

In a previous chapter the Perfectly Competitive Capital Markets Model and its view of systematic risk were described in relation to the risk of grain transportation. A direct result of that model is the Capital Asset Pricing Model (CAPM) which relates the degree of uncertainty about future returns of a particular company to the return obtainable through investment in a risk-free asset whose returns are certain. The manner in which the two are tied is through the risk premium required to invest in a diversified portfolio of

---

\* Exhibit R-4, p. 40.



all securities in the market. The Beta coefficient is the quantitative tie:

$$(R_i - R_f) = B_i (R_p - R_f) \quad (\text{Eq. 22})$$

$$\text{or } R_i = R_f + B_i (R_p - R_f) \quad (\text{Eq. 23})$$

where:

$R_i$  = the expected yield or return required to invest in the stock of company 'i';

$R_f$  = the expected yield required to invest in risk-free assets;

$R_p$  = the expected yield or return required to invest in the weighted market portfolio of all stocks; and

$B_i$  = (Beta) the measure of relative risk which equates the differential return required on the stock of company 'i' with the overall market differential.

Simply stated, the return required to invest in company 'i' will be equal to the risk-free interest rate plus a multiplicative premium dependent on the degree to which the returns of company 'i' fluctuate with overall market returns.

Since this relationship holds for all companies, we may relate two companies, 'j' and 'k,' through the market

portfolio return. First, rewrite (Eq. 23), as:

$$\frac{R_i - R_f}{B_i} = R_p - R_f \quad (\text{Eq. 24})$$

then designate (Eq. 24) for companies j and k:

$$\frac{R_j - R_f}{B_j} = R_p - R_f = \frac{R_k - R_f}{B_k} \quad (\text{Eq. 25})$$

and rewrite as:

$$R_j = R_f + (B_j/B_k) (R_k - R_f) \quad (\text{Eq. 26})$$

It was on the basis of this latter expression (Eq. 26) that the Provinces developed the cost of equity capital for CP Grain as 11.0 percent -- designating j as CP Grain and k as CP Limited (Consolidated). The result derived from this procedure was the cost of equity funds for CP Grain as calculated for a capital structure containing no debt. In order to account for the risk imparted to equity due to the existence of some debt in the enterprise, this estimate was adjusted upwards.

This adjustment procedure followed from the Provinces' acceptance of the hypothesis that the cost of equity was directly related to the debt-equity ratio. This relationship, it will be recalled, was due to the hypothesis that the risk to equity holders increased as the relative amount of debt increased, causing the cost of equity capital to increase:

Thus, the cost of equity capital must not only be adjusted for the differences in business risk, but also for the risk caused by differences in capital structure. If there were no differences in business risk we could start with the cost of equity capital for CP Ltd., and lower the estimate if one used the lower debt contained in CP Rail and raise the estimate if one used the capital structure we believe is appropriate.\*

The results of this adjustment procedure, which relies on the use of the Modigliani and Miller (M & M) model to predict the upper limit on the estimated cost of equity capital for CP Grain, are reported in full detail in the empirical part of this chapter.

#### Comparative Procedures

In addition to the three methodologies described above, a number of other procedures were utilized in estimating the appropriate equity funds rate. These included the application of risk premiums to CP or government bonds, the estimation of the ratio of earnings per share to book value per share for representative and comparable firms, the experience of other regulatory jurisdictions, the results for comparable industries and the judgment of an investment dealer. Each of these will be examined in the course of developing the results of their empirical testing.

---

\* Exhibit AMS-17, p. 154.

## General Evaluation of Methodological Techniques

The expert testimony presented before this Commission was conclusive in showing that no single measure or procedure was appropriate for the task of estimating the cost of funds rate for CP Limited, CP Rail or CP Grain. At the same time, in examining the testimony, submissions, and exhibits on this topic, we found that the results of the various tests and evaluations did point to an approximate range of 13.5 percent to 15.5 percent return on common equity (after corporate taxes). This is not to suggest that every one of the estimates undertaken and reported by this Commission fell strictly within this range. Two of the estimates were in the area of eighteen percent (17.8 and 18.5) and at least one was as low as thirteen percent. As explained elsewhere in this section, the unqualified use of such numbers may lead to erroneous conclusions. The weight of the findings did fall within the narrow band. Within that range, the preponderance of the accepted estimates fell within the narrow range of 14.4 and 14.6 percent, with several estimated exactly at 14.5 percent.

One should not conclude from the foregoing that the appropriate or most expeditious technique to utilize in the development of an equity funds rate is to generate as many estimates as possible and to take their simple

average. Nor should one conclude that the existence of a "normal" distribution of results was sufficient to lead to the acceptance of the mean, median or mode of the observations. However, having evaluated the appropriate techniques and having selected or ranked them according to logical consistency and appropriateness within the context of the examination, it is then appropriate to examine the results obtained from the preferred procedures against the "weight" of the evidence. To argue that this procedure is absolutely free of any bias is to delude oneself, since the analyst will undoubtedly reflect the concentration of the evidence in his review of the techniques. However, the primary test must always be the appropriateness and consistency of the theory on an a priori basis supported by the evidence.

In the present examination, after due consideration of all of the alternatives, we concluded that the information available from the discounted cash flow model was most appropriate and, in particular, the information derived from a proper examination of earnings-price ratios was singly most appropriate. We concluded that earnings-book approximations had biases, though we accepted that it was possible to correct for some of these. We also concluded that information derived from other regulatory decisions, while

enlightening, was not independently sufficient to establish an appropriate rate. In this regard, we agreed with the argument that singular acceptance of this technique rested on a circular analysis.

Also, we accepted that it was possible to gain added information about the nature of the "investing public's" attitude toward a stock from the opinions and informed judgment of individuals with practical knowledge and experience in the stock market. At the same time, we could only accept this as supportive information and not as our primary criteria. We also accepted that information derived from "Beta statistics" and the capital asset pricing model were useful in our overall evaluation, but we rejected this technique as the primary source of common equity funds rate evaluation. Lastly, we found the information on other railroads (U.S.) to be too dissimilar from CP Limited or CP Rail and the information on other utilities (including Canadian firms) to be of only marginal value in our evaluations.

In summary then, we placed more confidence in the results derived from earnings-price approximations in deriving our estimated common equity funds rates, than any of the other techniques. Secondly, we placed more confidence in longer term or averaged results than we did in the single results of one year or one firm.



## Significance and Measurement of Growth of CP Limited

Figure III (page 177) shows that the 1974 earnings per share and, to a lesser extent, the 1974 dividends per share for CP Limited were, at best, somewhat atypical. However, this figure also shows that both earnings and dividends have been growing over the past ten years. As evidenced by an earlier portion of this discussion, the factor of growth -- however measured -- is an important input to the development of the equity funds rate, when the methodology of the Discounted Cash Flow Model is adopted.

The difficulty which arises in using the DCF formula relates to the calculation of anticipated growth, a value which cannot be readily observed. The process of inferring a value for  $g$  or  $br$  is less sensitive in cases where growth is stable and predictable in conformance with the general theory of the DCF procedure. As elaborated in the railway submission:

The range of plausible projections in such circumstances is narrow and a choice can be made on grounds of forecasting efficiency. Unfortunately, C.P. does not fit into this mold. Earnings have exhibited sharp year to year variations and appear to exhibit a strong cyclical response. The cycles are of relatively long duration and any attempt to eliminate them statistically would give influence to events of 1945-65 which are of little or no relevance to current expectations....Any attempt

to infer a current anticipated growth rate for C.P. Ltd....must of necessity, be judgmental in nature.\*

The fact that earnings and dividend annual growth rates fluctuate widely can be seen in Table XXIX (following page). This variation in annual growth from - 21 percent to + 53 percent for earnings and from 0 to + 11.7 percent for dividends over the period 1964 to 1974 strengthens the necessity of relying on longer term trends when employing either measure as the basis for estimating g or br. With respect to 1974, some approaches to the growth in earnings and dividends have been summarized in Table XXVIII.

TABLE XXVIII		
C. P. Ltd. Growth in Dividends and Earnings to 1974		
	Dividends	Earnings
One Year	11.69%	53.01%
Five Year - Simple Average	6.18	24.54
- Weighted Average	8.09	33.94
Ten Year - Simple Average	5.65	11.13
- Weighted Average	6.33	16.66
Note: Weights for five years are 5, 4, 3, 2, 1 going back from 1974 and 10, 9, 8, etc. for 10 year weighted average.		

\* Exhibit R-4, pp. 33 and 34.

TABLE XXIX

CP Limited (Consolidated) Earnings and Dividend Growth, 1964-1975  
after Extraordinary Items

Year	Earnings per Share	Growth	Dividends per Share	Annual Growth	
				Date to 1974	One Year
1964	\$1.08		\$0.50	5.6	
1965	1.22	13.0%	0.53	5.5	6.0%
1966	1.42	16.4	0.58	5.0	9.4
1967	1.12	-21.1	0.58	5.8	0.0
1968	1.01	- 9.8	0.60	6.2	3.5
1969	0.91	- 9.9	0.64	6.1	6.7
1970	0.84	- 7.7	0.65	7.2	1.6
1971	0.96	14.3	0.66	9.1	1.5
1972	1.24	29.2	0.70	10.8	6.1
1973	1.66	33.9	0.77	11.7	10.0
1974	2.54	53.0	0.86	NA	11.7
1975	2.40	- 5.5	0.845		-1.7

Note: 1975 shown for information only, did not appear in railway exhibit and was not used in computations of either party.

Source: Exhibit R-4, p. 60 and AMS-17, p. 139.

Clearly, the period of analysis is important in evaluating growth. As discussed elsewhere, the Commission felt that longer term growth information was more significant and tended to be representative of the company's performance. At the same time, we also felt that the more recent years would be more influential in the minds of investors and potential investors so we favoured those techniques which gave greater weight to later years than earlier years. Table XXX illustrates the effect that the choice of number of years of analysis has on the estimated annual dividend growth rate.

TABLE XXX	
Effect of Weighted Average and Number of Years on Dividend Growth Estimates for C.P. Limited	
Years in Average	Weighted Average * Annual Dividend Growth Rate
1	11.69%
2	11.13
3	10.20
4	9.05
5	8.09
6	7.57
7	7.15
8	6.70
9	6.48
10	6.33
* See Note to Table XXVIII for example of weighting procedure.	

## Empirical Tests and Evaluations

Appendix G of Volume I of the Report of this Commission lists the results of 28 tests performed by one or more of the railways, Provinces and Commission in estimating the after tax capital funds rate applicable to common shareholders' equity for purposes of costing the transportation of grain by rail. As is evident from that listing (reproduced here for reference as Schedule IX), the results obtained in some estimations varied, depending on the assumptions employed. Since it was not possible to list all of these assumptions at each line of the comparative analysis, they were left for the fuller analysis in this section of the Technical Appendix. Where a dash (--) appears next to an entry, it is an indication that the party did not report the results of that particular estimation. The fact that a party reported a result does not mean that the party agreed with the appropriateness of the calculation in the derivation of the proper capital funds rate for common equity. In some cases, the rate was recalculated for rebuttal purposes to correct what was deemed to be an error or improper procedure, though the rebutting party placed no value in the resulting recalculated equity rate. In other cases, results were provided to illustrate a procedure and indicate the results of its application. That result may then have been rejected.

The twenty-eight tests are described below in the same sequence in which they appear in Appendix G (and Schedule IX). All of the tests are recorded in terms of after tax rates so that they represent the estimated rate either required, perceived or realized by the investor or potential investor in the common equity shares under examination. To the extent that the company is subject to corporate taxes on the amounts which would accrue to the equity shareholders, then the company must earn an amount in excess of that required by the equity shareholder. However, this calculation is a matter of arithmetic and does not, of itself, impact on the choice of appropriateness of one technique over another.

#### Discounted Cash Flow Approaches

Fifteen, or more than half, of all of the tests performed derive from the basic discounted cash flow (DCF) approach described supra. Five of these rely on the estimates of growth described in the previous section and the remainder deal with earnings price approximations of the value of the capital funds rate. For the first five, the basic formula is:

$$k = \frac{D}{P} + g \quad \text{or} \quad k = \frac{D}{P} + br \quad (\text{Eq. 27})$$



The dividend yield (D/P) is required for either formula. Both the railways and the provinces\* utilized a 1974 dividend yield rate for CP Limited of 6.11 percent. This yield was obtained by dividing the 1974 dividend per share of \$0.86 by \$14.08 -- the average of the month-end market price of CP Limited common stock.

The 6.11 percent is expressed as a rate. Likewise, the growth ('g' or 'br') is expressed as a rate and the two are additive. In the following sections we will refer to computations such as:

when combined with the common dividend yield of 6.1 percent, these estimates ... produced the equity funds rates computed at ...\*\*

In every such instance, we are referring to the addition of the 6.11 percent to the growth estimate to derive the capital funds rate listed in Schedule IX. As such, we will not repeat the source of this 6.1 percent beyond this point.

As described infra, the wide fluctuations in the one-year growth rates in the earnings and dividends of CP Limited over the past ten years strengthen the necessity of relying on

---

\* Exhibit R-4, p. 43 and Exhibit AMS-17, p. 129.

\*\* See following pages for instances of this general statement.

longer term trends when employing either measure as the basis for estimating 'g' or 'br'.

Ten Year Average Earnings: For the period 1965 to 1974, the railways computed<sup>\*</sup> the average annual year to year growth in earnings to be 10.9 percent<sup>\*\*</sup> and noted that this rate was somewhat less than the 1973-1974 growth in dividends of 11.7 percent. This increase of 11.7 percent occurred in a year in which the dividend payout rate of 33.9 percent<sup>\*\*\*</sup> was well below the historical average. Given this latter information, the 10.9 percent estimate was judged as reasonable. When coupled with the 6.1 percent dividend yield, this 10.9 percent growth estimate produces the computed rate of 17.0 percent shown in the column under "Railways" in the first row of Schedule IX.

The Provinces used the same basic data to compute equity funds rates which ranged from 10.3 to 14.1 percent -- the range was dependent on the techniques used to estimate growth for the period 1964 to 1974. The Provinces computed the simple compound growth rate in earnings to be approximately

---

\* Exhibit R-4, p. 43.

\*\* Taking the data of Table XXIX:  $(16.4 - 21.1 - 9.8 - 9.9 - 7.7 + 14.3 + 29.2 + 33.9 + 53.0)/9 = 10.9$ .

\*\*\* Computed from row 4 of Schedule X which lists the annual retention rates. The dividend payment rate is equal to one minus the retention rate.

8 percent<sup>\*</sup> and noted that the technique ignored the growth pattern of earnings and was sensitive to the study period selected.<sup>\*\*</sup> To show this sensitivity, the Provinces pointed out that the choice of the years 1969 to 1974 would have yielded a simple annual compound growth rate of 19 percent. They also pointed out that the 1974 observation of earnings per share was atypical and the choice of 1974 as the terminating year, coupled with the use of the simple compound growth rate, "vastly overestimates the expected future growth rate."<sup>\*\*\*</sup>

To compensate for this, the Provinces suggested that the use of least squares regression techniques yielded a better description of the pattern of earnings over time. Using a linear regression, the 10 year growth rate in earnings was found to be 4.5 percent. Estimating growth using a log-linear regression technique (the annual earnings per share are converted to natural logarithmic equivalents and

---

<sup>\*</sup>Earnings growth for 1974 over 1964 was  $2.54/1.08 = 2.352$  (135%), which converts to a compound rate of about 8 per-

cent (i.e.,  $(1.08)^{10} = 2.16$ ). Mathematically, the compound rate would be closer to 1.0893, i.e., 8.9 percent.

<sup>\*\*</sup>Note that for the same period, the simple average of year to year increases was 11.1 percent. (Table XXVII).

<sup>\*\*\*</sup>Exhibit AMS-17, p. 126.

regressed against time, so that the slope of the graph represents the growth rate in earnings), as displayed in Figure IV (following page), the Provinces computed an annual growth rate of 4.2 percent.\* When combined with the common dividend yield of 6.1 percent, the simple compound growth of 8.0 percent produced an equity rate of 14.1 percent, the linear regression estimate of 4.5 percent produced 10.6 percent and the log-linear estimate of 4.2 percent produced the lower 10.3 percent equity rate.

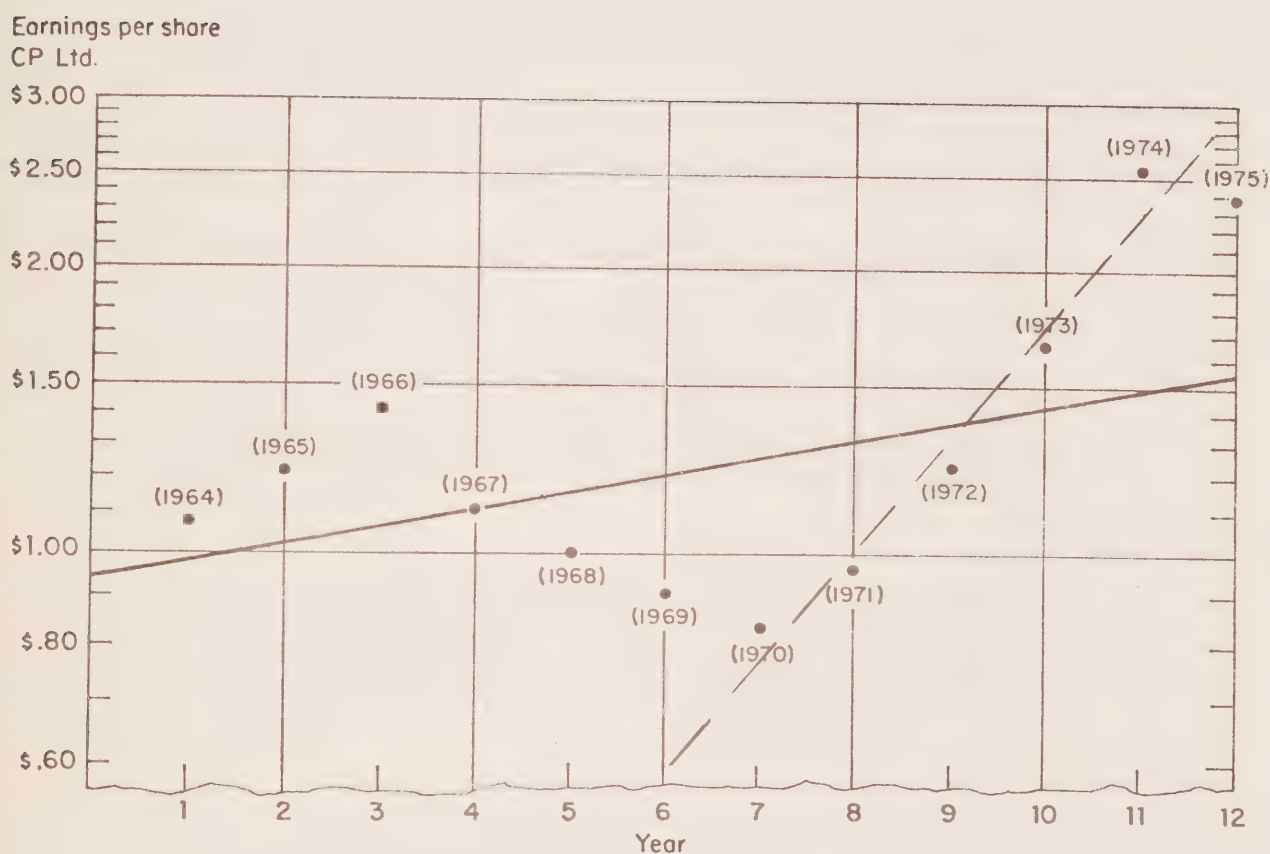
To examine the effects of the choice of time span, the Commission tested the five year regression of 1970-1974 data, using the same log-linear regression technique and found a five year growth rate (the dotted line of Figure IV) of approximately 27 1/2 percent\*\* which is clearly dependent on the choice of time frame. Also, the Commission noted that the simple compound growth for the longer period 1964-1975 was 7.6 percent, while the simple average of the year to year growth rates for the same period was 7.2 percent. Respectively, these compared to the 8.9 percent simple compound growth and 11.1 percent simple average of the year to year growth for 1964-1974. The "drop" in earnings per share in 1975 significantly influenced the results.

---

\* Exhibit AMS-17, p. 126. This regression had a poor correlation ( $r^2 = 0.19$ ).

\*\*  $\ln \text{earnings} = -0.540 + 0.276 \text{ time}$  ( $r^2 = 0.96$ ).

# EARNINGS OF CANADIAN PACIFIC LIMITED AS A FUNCTION OF TIME 1964-1974



$$\ln \text{ earnings} = -.061 + .0419 \text{ time}$$

Note: 1975 earnings for information only, not used in regression.

SOURCE: Exhibit AMS-17, page 140

The Commission felt that the appropriate procedure for the development of an unweighted average was perhaps best represented by the simple compound growth rate. This yields the computed rate of 15.0 percent (8.9 + 6.1) reported in row 1.1 of Schedule IX under "Commission."\* This procedure gives greater impact to later years, because of the compounding effect. As noted elsewhere, we felt that the volatility of the earnings growth figures in the period 1972-1974 meant that the technique needed to be used with care and, as such, we did not rely heavily on this first technique or its results.

Ten Year Weighted Average Earnings: During cross-examination of Dr. Gordon, he agreed that in two of his books he had used a method of weighting the observations of each year which gave greater significance to the observations of later years:

DR. GORDON... I would think the best method would be to either use five or possibly even ten years using an exponentially - weighted average which would give more weight to the recent past than the distant past.\*\*

---

\* Note that this is reported correctly in Schedule IX, but that Appendix G of Volume I of the Report contains an error, showing this rate as "13.7" instead of "15.0".

\*\* Transcript, Vol. 32, pp. 6159 and 6160.



In line with this cross-examination regarding the appropriateness of using weighted values of earnings growth, the railways introduced the data shown in Schedule XI which was developed in the same fashion as Dr. Gordon had proposed.\* Based on the exponentially-smoothed growth rate to 1974 of 12.9 percent, the railways estimated the equity rate of 19.0 percent.

The Provinces, in their summary statement, presented the following conclusion regarding the use of weighted observations and the proper return one would derive under these circumstances:

The actual long term growth was generally less than the estimate of long term growth mentioned earlier. However, it is likely that additional weight should be placed on the recent favorable experience so that an estimate as high as 7% is appropriate.\*\*

From this estimated growth, the Provincial estimate of 13.1 percent (7.0 plus 6.1) as shown in line 1.2 of Schedule IX was developed.

Clearly, the method of weighting the observations has a significant impact on the ultimate answer, as does the

---

\* M.J. Gordon, The Investment, Financing and Valuation of the Corporation, Homewood, 1962, p. 158.

\*\* Submission of the Provinces of Alberta, Manitoba and Saskatchewan on Capital Costs, p. 17.

time frame of the analysis. As shown in an earlier section, the weighting of observations can affect the computed results by five or ten percentage points. The results of Table XXVIII (page 200) could lead to the computation of equity funds rates of 17.2, 22.8, 30.6, 40.0 or 59.1 percent (adding the dividend yield of 6.1 percent to the earnings growth estimates shown thereon). All of this goes back to the apparent anomaly of 1974 earnings in the context of the immediate past and future. The Commission did not recompute the estimate provided in Schedule XI, but noted that the 1974 growth rate (g) was more than double that of any other single annual change, and, again cautioned against the unqualified use of these results.

Dividends: As an alternative to using the growth in earnings, the Provinces and the railways examined the growth in dividends for CP Limited. As can be seen from the data in Table XXIX, the year to year growth in dividends varied from 0 to 11.7 percent during each of ten years to 1974. Based on these data the railways concluded:

In 1974, the dividend grew by 11.7%. The 1974 dividend payout rate was only 33.9%, well below the historical average. The average annual year-to-year growth in earnings over the 1965-1974 period was 10.9%, which is somewhat less than

the 1974 dividend increase, but this has been accompanied by a downward drift in payout rate. Restoration of a more normal payout rate would require dividend growth at a higher rate than earnings growth, so an 11.7% dividend growth rate appear a plausible expectation in the light of information available in that year.\*

This 11.7 percent dividend growth rate converts the DCF estimate of equity capital funds rate to 17.8 percent for the railway procedure.

For the Provinces, three different estimates of equity funds rate were produced on the basis of dividend growth information. When the logarithmic values of dividends for the ten-year period 1964 through 1974 were regressed against their respective years, the resulting growth rate estimate was 4.6 percent. The simple compound growth in dividends for the same period was 5.6 percent. For the shorter five-year period from 1969 to 1974, the period of recent earnings growth, the simple compound growth rate of dividends was 6.1 percent. When each of these was combined with the dividend yield of 6.1 percent, the three Provincial estimates of 10.7, 11.7 and 12.2 percent were produced.

---

\* Exhibit R-4, pp. 43 and 44.

The declaration of dividends is within the discretion of management and the growth of dividends in recent years has increased sharply from a "stable" level of 5.0 to 6.2 percent to a new level of 11.7 percent. Accordingly, the Commission has shown the results derived from the one-year growth rate as 17.8 percent. But, because of the volatility we stressed earlier, we have to emphasize that this result did not enter into our final estimates of appropriate equity funds rates. Rather, the weighted average of the five-year growth of dividends, at 8.1 percent (see Table XXVII and XXX) provided us with a much more stable estimate of the growth of dividends and the equity funds rate of 14.2 derived therefrom was input to our final decision of the 14.5 percent accepted rate.

Retention Rate/Return: As described in the introduction of this section, the growth rate that investors expect in the future, and which influences their anticipation of return, can be estimated by using 'br' (the product of the firm's retention rate and its return on investment) under certain circumstances. The Provincial rebuttal submission notes:

It has the advantage that in empirical work it does a better job of explaining the differences in value among firms than other measures ...

differences in firm value are better explained by setting growth equal to past levels of  $\beta$  than by using other variables.\*

Based on an estimated marginal return on new investment of 15 percent and a ten-year average retention rate of 0.45 (used by all parties\*\* and assumed, on average, to continue into the future) the Provinces calculated future growth based on one, three and five year trends to be 6.9, 4.4 and 3.2 percent.\*\*\* With the 6.1 percent dividend yield, the Provinces computed equity funds rates as ranging between 9.3 and 13.0 percent.

In their summary submission, the railways argued:

On the one hand, Dr. Gordon feels that the historical rate of return earned by CP Ltd. is not a useful estimate of "R", the marginal rate of return expected on new investment. It is unsatisfactory because it would imply that investors expect CP Ltd. to invest in new projects that are expected to earn even less than his lowest estimate of CP Ltd's cost of equity capital. Consequently Dr. Gordon arbitrarily assumes a rate of 15 % for "R".

On the other hand, Dr. Gordon is quite prepared to use an average historical retention rate as his estimate of "B" despite the marked trend

---

\* Exhibit AMS-17, p. 128.

\*\* Exhibit AMS-17, p. 128 and Exhibit R-4, p. 42.

\*\*\* See Schedule X.

in that rate since 1970 and despite the fact that he has acknowledged that CP Ltd. appears to have found, in recent years, new areas in which to invest profitably. The railways submit that, logic dictates investors taking the view that the observed increase in CP Ltd's retention rate has occurred because CP Ltd. has chosen to reinvest earnings in projects which it expects will be especially profitable.

The sensitivity of the estimated growth rate (and hence the cost of capital) to Dr. Gordon's arbitrary selection of 15% for "R" and his reliance on the historical average for "B" is illustrated below:

<u>Retention Rate ("B")</u>	<u>Marginal Rate of Return on New Investment ("R")</u>	<u>Growth Rate ("BR")</u>
.45	15%	6.7 %
.50	15	7.50
.55	15	8.25
.55	17	9.35
.60	17	10.20
.55	18.2	10.01

The railways submit that the values of "B" and "R" used by Dr. Gordon are unreasonably low and should be replaced by a combination giving a growth rate in excess of 10%\*

Based on this Table, the Commission inferred that the railways would calculate a capital funds rate for equity of at least 16.1 percent (10.0 + 6.1).

The Commission computed the growth rate using one-year data and the 6.1 percent yield. This 13.0 percent

---

\* Summary and Final Argument of Canadian National and CP Rail, Cost of Capital Section, pp. 10 and 11.



estimate, though one year, is based on embedded book rates and is generally less desirable than an estimate based on the incremental change for that one year, or preferably, for several years. Because of this reliance on book values, this Commission accorded lower weighting to this procedure in evaluating the overall methodology and empirical results of this task.

Average Return - New Investment: As acknowledged by the Provinces in their rebuttal submission:

An average of the rates of return on common equity over the last five years is probably a downward biased forecast of the return CP Ltd. is expected to earn on new equity investment.\*

What the investor incorporates in cost of capital estimates are his expectations of future rates of return and, probably, future retention rates. These expectations may well differ from past experience -- particularly if new investments have a significant effect on total investment.

In their summary submission (quoted supra) the railways, in rejecting the use of an historical retention rate, argued that CP Limited has chosen to reinvest in profitable projects, reflecting investors' acceptance of higher retention

---

\* Exhibit AMS-17, p. 128.

rates. From this and with reference to the data in the earlier quoted Final Argument the railways contended that a growth rate in excess of 10 percent was reasonable, particularly in light of investments in new projects occurring in inflationary periods. During cross-examination, Dr. Quirin further supported his reliance on an 11.7 percent growth rate in dividends by referring to the Provincial exhibit (AMS-17) reproduced here as Schedule XI. He pointed out that earnings per share had increased from \$0.84 in 1970 to \$2.54 in 1974, an increase of \$1.70, and that this had been accomplished on an increase in book value of \$6.71 (from \$17.55 to \$24.26). This yielded "a marginal rate of return on the additional funds invested of 25.3 percent."\* This return on new investment, and an average retention rate of 0.45, produces an implied growth rate of 11.3 percent and a capital

---

\* Transcript, Vol. 10, p. 1832.

funds rate of 17.4 percent.

Table XXXI	
Possible Growth Rates for B = 0.45 with New Investment Return	
Average Rate of Return on New Investment	Implied Growth Rate (br)
10%	4.5%
12	5.4
14	6.3
16	7.2
18	8.1
20	9.0
22	9.9
24	10.8
26	11.7
28	12.6
30	13.5
Source: Exhibit AMS-17, p. 128.	

The Provinces, on the other hand, determined that:

A generous estimate of the average rate of return on new investments for CP Ltd. is about 15 percent.\*

The implied growth rate of 11.3 percent is derived from page 128 of the Provinces' Exhibit AMS-17 (reproduced above as Table XXXI) by interpolation [i.e.,  $1/2 (11.7 - 10.8) + 10.8 = 11.3$ ]. On the basis of this direct estimation, and

---

\* Exhibit AMS-17 p. 129.

in light of the 0.45 retention rate, the Provinces concluded that the best estimate of growth for CP Ltd. was 6.75 percent, yielding a calculated capital funds rate of 12.9 percent.

The Commission examined the marginal return on new investment for each year from 1970 to 1975 and found the following results:

TABLE XXXII	
Marginal Return on New Investment	
Year	Marginal Return
1970-71	16.7%
71-72	11.1
72-73	17.2
73-74	86.3
74-75	-17.5
and 70-75	16.5%
Source: Derived from Schedule X.	

Clearly the change in earnings for the one year 1974 over 1973 was particularly atypical -- a fact which has been repeatedly stated in this report. When measured in terms of marginal return on investment, it yields results some five times greater than the previous years.

To correct for the abnormal influence that 1974 might introduce into the analysis, the Commission, for this single test, used the 1970 to 1975 average marginal rate of return and the historical retention rate of 0.45 to compute an implied growth rate of 7.4 percent from Table XXXII and a resulting capital funds rate of 13.5 percent ( $6.1 + 7.4$ ). If we accept the retention rate of 0.55 proposed by the railways, our 16.5 percent marginal investment return would have produced an estimate of 9.1 percent growth rate and an implied equity rate of 15.2 percent.

We have considerable faith in the estimated marginal investment return calculated in this fashion. The appropriate retention rate is not quite as clear, though an estimate of 0.45 to 0.55 (see Schedule X) does not seem unreasonable. For the 1970-1975 period, the overall rate was about 0.53.\* If this is applied to the 16.5 percent return, we derive an estimated growth of 8.7 percent and an equity funds rate of 14.8 percent.

#### Earnings/Price Approximations

In our general discussion of methodologies, we elaborated on the conditions under which earnings price ratios could be

---

\* Average dividends per share 1970-1975 were \$0.748, average earnings per share \$1.61. Retention rate =  $(1.61 - 0.75) / 1.61 = 0.534$ .

employed as a simplified version of the discounted cash flow methodology.

The use of comparable earnings relies heavily on the notion of opportunity cost and assumes that competitive pressures within capital markets will tend to equilibrate the rates of return achievable on equity investments, when risk variations have been recognized. By examining companies of comparable risk, it is expected that valid estimates of equity funds rates can be developed. The problem becomes one of defining the risk level of the company under examination and developing measures of risk which enable inter-company comparisons. Unfortunately, no standardized approach to the measurement of risk has been generally accepted in the field of capital cost. Compounding this is the lack of "convincing evidence that market valuations (and costs of capital) are determined by any single measure."\*

In attempting to overcome this lack, the railways introduced a procedure of ranking the relative riskiness of a sample of 157 companies that was designed to identify those sample companies which possessed low risk characteristics. This ordinal measurement of risk was developed in the following sequence:

---

\* Exhibit R-4, p. 35.



- five separate, quantifiable risk indicators were established, and calculated for each company in the sample,
- for each risk measure, companies were ranked in ascending order of riskiness, so that each company ended up with five numbers associated with it,
- the sum of these numerical rankings provided the composite ordinal ranking of riskiness for the 157 companies,
- the companies were re-ranked in ascending order of the composite score and separated into quintiles of comparable risk.

The results of this procedure, for the 63 least risky companies (40 percent of the sample population) are shown in Schedule XII.\* The five separate risk measures developed by the railways were:

- (1) The maximum percentage shortfall in annual earnings per share below the trend value fitted on annual data for fiscal years 1964-1974 inclusive.
- (2) The mean absolute deviation, (expressed in percentage terms), of annual earnings per share about a three year moving average. Annual data for the fiscal years 1964-1974 inclusive were used.

---

\* CP Limited would have ranked twenty-fifth if it had been included. It was excluded since the results were to be used to determine the cost of equity capital applicable to CP.

- (3) The maximum drop, (expressed in percentage terms), over a 12-month period in share price. Month-end prices for the five-year period July 1970-July 1975 inclusive were used.
- (4) The systematic component of the variation in the price appreciation component of investor yields as measured by the Beta factor utilizing month-end share prices for the five-year period July 1970-July 1975 inclusive.
- (5) The total variability in investor yields as measured by the standard deviation of the price appreciation component utilizing month-end share prices for the five-year period July 1970-July 1975 inclusive.\*

From the basic data for quintiles 1 and 2, the railways and Provinces developed several estimates of the appropriate capital cost of funds rate for common equity of CP Limited. The cost of capital evidence submitted by the Provinces examined both earnings/price and earnings/book approximations while that of the railways was directed more heavily to earnings/book estimations.

Comparable Risk Companies - Unadjusted: The Provinces cautioned against using the earnings/price ratio since

there are numerous random disturbances that distort the earnings/price ratio for a particular firm.\*\*

---

\* Exhibit R-4, p. 36.

\*\* Exhibit AMS-17, p. 130.

Since the use of the average E/P ratio for a large number of firms could remove a substantial amount of this randomness, the Provinces agreed that Dr. Quirin's procedure for comparable risk companies may be appropriate. For the firms in Dr. Quirin's quintiles 1 and 2, the Provincial experts noted that the simple average earnings/price ratio of these 63 firms was 12.7 percent.\*

Though the basic data on which this was based was not contained in the Provincial rebuttal submission, one of the sources listed for that information is "Dr. Quirin's Working Paper." We have displayed some of the data contained in these working papers in Schedule XII. For the 63 companies of quintiles 1 and 2, we computed an average earnings/price ratio of 13.4 percent. However, because of the weaknesses inherent in unadjusted earnings/price data, the Commission did not undertake any further analysis on this basis. Although the process of averaging may partially remove the effects of differences between earnings and the firm's cost of capital, there is no means of ensuring that this will be systematically true -- on average. Therefore, we were reluctant to place much emphasis on this procedure and its results.

---

\* Ibid.

Comparable Risk Companies - Adjusted for M/B: The Provinces found that the quintile 1 and 2 (i.e., data for firms which Dr. Quirin claims have the same risk as CP Ltd.), produced an average market-to-book rate of 1.81.\* The Provinces also agreed with the submission and testimony of Dr. Quirin, that market value over book value ratios will reflect the incidence of earnings different from the firm's cost of capital. In other words:

This indicates that firms in the sample have earned a rate of return in excess of their cost of capital and that the earnings price ratio will understate the true cost of capital (and the earnings book ratio will overstate it)\*\*

To compensate for this, the Provinces used a simple linear regression technique to estimate the relationship between earnings/price and market/book ratios. For the 63 firms in quintiles 1 and 2, the results\*\*\* were:

$$\frac{\text{Earnings}}{\text{Price}} = 0.1556 - 0.0182 \frac{\text{Market Value}}{\text{Book Value}} \quad (\text{Eq. 28})$$

Since, when the M/B ratio is equal to 1.0, the earnings/price ratio estimates the cost of funds rate for these firms,

---

\* Op. Cit.

\*\* Op. Cit.

\*\*\* Exhibit AMS-17, p. 131.

the Provincial experts computed that a better estimate of the cost of equity funds for the firms in quintiles 1 and 2 (and hence for CP Limited) was:

$$\frac{E}{P} = 0.1556 - 0.0182 = 13.74 \quad (\text{Eq. 29})$$

This adjustment process, the Provinces submitted, would:

give a rough estimate of the cost of equity capital of 13.7 percent, which is quite close to the estimate obtained by using the full DCF formula for CP Ltd. directly.\*

Inasmuch as the market value over the book value for each company entered the regression equation, the estimate of 13.74 percent will have an upward bias if any of the companies in the sample earned returns on book equity which exceeded the returns that the firm is expected to earn on new investment.

To the extent that accounting practices tend to understate the book value of the common equity this bias will be present.\*\*

The implications of this argument are that the 13.7 percent estimate could be an overstatement of the cost of funds rate. However, we were not convinced that this argument was purely asymmetrical and could not conclude that the procedure yielded such an upward bias. Because of the

---

\* Ibid.

\*\* Ibid.

comparative nature of the firms, we were attracted to the use of their price data, however adjusted, for estimating the appropriate CP Limited rate.

Comparable Risk Companies within 10% of M/B = 1: An alternative method of adjustment was also developed in the Provincial submission, though they admitted it was a "somewhat cruder way of accomplishing the same objective."\* In this approach, the comparable risk companies in Dr. Quirin's sample were examined to determine the earnings/price ratio of companies which had market-to-book ratios in the region of 1.0. The average of these companies should provide an estimate of the cost of funds after removal of the effect of firms earning more or less than their actual cost of funds from the former averaged ratio.

In the first instance, the eleven companies (shown on Table XXXIII) with market-to-book ratios within 10 percent of 1.0 were used to estimate the E/P ratio. The average M/B ratios for these companies was 0.995 and the average earnings price ratio for the eleven companies was 14.0 percent.

---

\* Ibid.



TABLE XXXIII

## EARNINGS/PRICE RATIOS FOR SELECTED COMPANIES

FROM DR. QUIRIN'S QUINTILES 1 &amp; 2

WITH MARKET/BOOK RATIOS WITHIN 20 PERCENT OF 1 AND WITHIN 10 PERCENT OF 1

	<u>Market/Book Ratio</u>		<u>Earnings/Price Ratio</u>	
	<u>Within 20%</u>	<u>Within 10%</u>	<u>Within 20%</u>	<u>Within 10%</u>
British Columbia Telephone	.80		10.9%	
Blater Steel Ind.	.80		26.6	
Algoma Central Railroad	.84		10.1	
Distillers - Seagrams	.88		11.0	
Bell Telephone of Canada	.90	.90	13.2	13.2
Canron, Ltd.	.94	.94	23.6	23.6
Hudsons Bay Company	.95	.95	8.9	8.9
Canada Packers	.99	.99	11.0	11.0
Steel Company of Canada	.99	.99	15.7	15.7
Alcan Aluminum	.99	.99	14.0	14.0
Canada Cement Lafarge	1.01	1.01	10.2	10.2
Algoma Steel	1.02	1.02	10.8	18.9
Steinbergs	1.03	1.03	12.5	12.5
Canadian Utilities	1.04	1.04	14.2	14.2
Trans-Canada Pipe Line	1.09	1.09	12.2	12.2
Exaco Canada	1.12		14.9	
Dominion Stores	1.12		14.5	
Phillips Cables	1.13		14.9	
Iminex, Ltd.	1.14		12.2	
Ajax	1.14		22.7	
Northern and Central Gas	1.17		14.1	
Average	1.004	.995	14.59%	14.0%

Exhibit AMS - 17, pages 144 and 145.

This value of 14.0 percent is shown under the "Commission" column in Schedule X since the Commission agreed that some adjustment to the raw E/P ratios of Dr. Quirin's first and second quintiles was necessary and that this adjustment procedure produced a reasonable estimate of the earnings price relationship for the firms of comparable risk in quintiles 1 and 2.

Also, the Commission tested the effect of changing the range of this examination and found the results to be relatively stable and predictable. When the range was narrowed to restrict it to market/book ratios within five percent of 1.0, the resulting average earnings/price ratio for the eight firms was 13.2 percent (average M/B = 1.003); when extended to 15 percent of 1.0, the average earnings/price ratio for 17 firms was 14.4 percent (average M/B = 1.028).

The Commission also tested the relationship of M/B ratios and earnings/price ratios, by regressing the latter on the former. Though the statistical measure of correlation was exceptionally poor, the results were supportive of the general findings in this area. For the 11 observations within 10 percent of 1.0, the following relationship was found:

$$\frac{E}{P} = 27.365 - 13.390 \frac{M}{B} \quad (\text{Eq. 30})$$

Since we are interested in the value of these observations when  $M/B = 1.0$ , we can substitute this value in the above equation to derive the estimated earnings/price ratio after correcting for market and book price differentials:

$$\frac{E}{P} = 27.365 - 13.390 = 13.975 \quad (\text{Eq. 31})$$

This number is, again, close to the 14.0 reported previously.

The correction for market/book ratios different from 1.0 was important in the development of the Commission's final estimated capital funds rates.

Comparable Risk Companies Within 20% of  $M/B = 1$ : As a further verification of the results obtained by adjusting the earnings/price ratio averages to reflect market value and book value equality, the Provinces took the 21 firms which had market/book ratios within 20 percent of 1.0 and averaged their E/P ratios. The firms with M/B ratios between 0.80 and 1.20 included the previous subset of firms within 10 percent and had an average market-to-book ratio of 1.004. As shown in Table XXXIII these firms had an average earnings/price ratio of 14.6 percent.

The estimate of 14.6 percent was judged by the Commission to be more reasonable than the unadjusted average for the firms of quintiles 1 and 2 and was regarded very favorably as indicative of the appropriate rate for CP.

CP Limited 1973/74 Average E/P: As discussed previously (See Figure III) the 1974 earnings of CP Limited appeared higher than the level that might have been predicted, based on past realized levels. As can be seen in Table XXIX, the earnings per share in 1974 were 53 percent higher than those of 1973 and more than twice the level of 1972 earnings per share. In addition, the data for 1975 suggests that the upward trend from 1970 may not have been expected to continue indefinitely into the future. As indicated by the Provinces in their rebuttal submission:

One indication that the recent upsurge in growth is not expected by investors to continue into the future is that market prices have virtually not increased with the increase in earnings despite a growth rate well above the average for the market. Another indication that the recent growth is not expected to continue is management's failure to raise dividends to keep pace with increased earnings.\*

For these reasons, the Commission computed the average of the 1973 (10.5 percent) and 1974 (18.2 percent) earnings

---

\* Exhibit AMS-17, p. 127.

price ratios for CP Limited. This average of 14.4 percent was not specifically computed by either the railways or the provinces. The data for this computation was taken from Exhibit AMS-17 at page 146 and is reproduced as Table XXXIV.

TABLE XXXIV				
Historic Ratios of Earnings over Price Canadian Pacific Limited 1969-1975				
Year	P/E Ratios High	Low	Average P/E	Earnings Price
1975	7	5	6.0	16.6%
1974	7	4	5.5	18.2
1973	11	8	9.5	10.5
1972	13	11	12.0	8.3
1971	15	11	13.0	7.7
1970	17	12	14.5	6.9
1969	19	14	16.5	<u>6.1</u>
Average 1969-1974				9.6%
Source: Exhibit AMS-17, page 146.				

The earnings/price ratios shown represent the reciprocals of the average price/earnings ratios for those years. The average price/earnings ratios, in turn, were developed by simply taking the midpoint between the high and low P/E ratios for each year.

A similar result is obtained if the net income per share (before extraordinary items such as gain on sale of land after income taxes) in each year (\$1.60 in 1973 and \$2.61 in 1974) is divided by the average of the 12 month-end Toronto Stock Exchange prices for each of the two years (\$16.86 in 1973 and \$14.08 in 1974). The average of these two ratios is 14.0 percent  $[(9.5 + 18.5)/2 = 14.0]$ , a number which is close to the 14.4 percent reported above. If the net income per share is taken after extraordinary items, the average for the two years becomes 14.49 percent  $(10.02 + 18.96)/2 = 14.49$  - again, very close to the 14.4 percent.

CP Limited 1974 E/P: The railways, Provinces and Commission each computed a value for the 1974 earnings/price ratio of CP Ltd.

The railways based their estimate on the 1974 earnings level of \$2.61 per share as restated in the 1975 Annual Report (pursuant to the procedures for accounting for loss compensation introduced in 1975), and the \$14.08 price derived from the average of the twelve month-end prices, as described above, and computed the rate as 18.5 percent. \*

---

\* Exhibit R-4, p. 41.



The Provincial estimate was derived\* from the reciprocal of the average price/earnings ratio of 1974 (5.5) as described in the previous section. The difference between the 18.5 percent estimate of the railways and the 18.2 percent of the Provinces may easily be due to the rounding of the high and low price/earning ratios to the nearest whole number.

The Commission felt that the result computed by the railways for the year 1974 for the CP Limited earnings/price ratio was the more accurate computation. Having said that, however, we again emphasize that the results obtained for one year - any year, should be viewed with some caution. In particular, the results of 1974, taken singly, cannot be defended.

CP Limited 1974 M/B in E/P Regressions: The regression equation described in the Provincial rebuttal submission (see equation 28, page 226) which adjusted the earnings/price approximation to reflect market value and book differences was used by the Commission to determine the 1974 E/P ratio for CP Limited that would have been predicted on the basis of the experience of the 63 companies in Dr. Quirin's

---

\* Exhibit AMS-17, p. 132.

first and second quintiles.\*

Substituting the 1974 CP Limited market-to-book ratio of 0.584 in the E/P regression equation yields an estimated rate for CP Limited of 14.5 percent:

$$\frac{E}{P} = 0.1556 - (0.0182 \times 0.584) = 14.50 \quad (\text{Eq. 32})$$

The effect of this procedure is to adjust the 1974 CP results for the anomalous earnings/price results on the basis of the general characteristics of the firms of comparable risk. We had much more confidence in this estimate as an appropriate 1974 equity funds rate for CP Limited for 1974 than we did in the unadjusted rate of 18.5 percent.

CP Limited 1974 E/P (Earnings Smoothed): The smoothed regression results shown in Figure IV suggested that 1974 earnings per share of \$2.54 (this Provincial data was unadjusted for the changes in accounting for loss compensation introduced in 1975) were well above the expected result of about \$1.49. To correct for the overstatement that this would impart to the earnings/price ratio, the Provinces substituted the smoothed estimate of earnings taken from the regression of earnings against time and came

---

\* The use of this relationship and any reliance on its results implies an acceptance that the data for these companies is representative of the risk characteristics of CP Ltd.

up with an estimated earnings/price ratio of 12 percent.\*

CP Limited 1969-74 Average E/P: Based on the information derived from the 1973, 1974 and 1975 Annual Reports to the Shareholders of Canadian Pacific Limited, (see Table XXIV) the Provinces computed the average earnings/price ratio for the period 1969-1974 as 9.6 percent.\*\* This process of averaging was proposed to "eliminate some of the randomness" though it was admitted that "this is not a very satisfactory procedure, however, since it is likely that the cost of capital has changed over time."\*\*\*

CP Limited Adjusted for Regulated Divisions, E/P:  
This heading, used in Volume I to describe the estimate of 17.6 percent as reported by the railways at page 41 of their initial submission (Exhibit R-4), may appear slightly misleading. As described earlier in this part of the chapter, the railways undertook considerable mathematical analysis which showed that the estimated earnings/price ratio provided a lower-bound estimate for the cost of capital when

---

\* Exhibit AMS-17, page 132. Substituting in the regression  $(-0.061 + 0.0419 \text{ time})$ , the value of 1974 (i.e., 11), yields the ln earnings predicted value of 0.3999 which converts to \$1.492 as the estimated 1974 earnings per share. Using the price of \$14.08 actually yields an estimate of 10.6 percent.

\*\* Ibid.

\*\*\* Ibid.

the earnings of unregulated divisions of a company were equal to or greater than the overall cost of capital to the company.

Based on the market/book ratios of nine public companies in which CP Limited had a significant shareholding, which ranged from 0.81 to 1.80 but centered around 1.0, the railways concluded:

These market-book ratios suggest that at least some of these companies are expected to earn in excess of their costs of capital.\*

TABLE XXXV			
Market-Book Ratios of Companies in Which C.P. Ltd. Has Significant Shareholdings			
Company	Book Value per Share Dec. 31, 1974	Market Value Dec. 31, 1974	Market-Book Ratio
Algoma Steel	30.545	25.000	1.818
Cominco	22.525	24.500	1.088
Great Lakes Paper	14.772	14.750	0.998
McMillan Bloedel	24.195	21.750	0.899
MICC Investments	7.560	8.000	0.945
PanCanadian Petroleum	4.301	7.750	1.802
Rio Algom Mines	20.454	19.000	0.929
TransCanada Pipelines	8.910	8.205	0.926
Union Carbide	17.596	14.250	0.810
Source: Exhibit R-4, p. 61.			

\* Exhibit R-4, p. 40.

This fulfilled the condition stated earlier and implied that it would be appropriate to adjust the E/P ratio to reflect the bias.

The CP Limited E/P estimate used in this context for 1974 of 17.6 percent was derived from the average month-end price of \$14.08 and the reported unadjusted earnings of \$2.48. Subsequently, the 1974 earnings were restated to \$2.61, due to the change in accounting procedures consistent with The Railway Advance Payment Regulations, pursuant to Appropriations Act No. 4, 1975, as reported in the 1975 Annual Report To Shareholders. This adjusted the E/P ratio to 18.5. To account for this difference, the railways averaged the two and used 18.1 percent.

The further analysis developed in the railway submission used the ten-year average retention rate for CP Limited of  $b = 0.45$ , and "a reasonable expectation... that not more than 5 percent of retained earnings were so invested (in restricted-income railway services)" \* and the average 1974 E/P ratio of 18.1.

Based on these data, the railway capital cost expert concluded that, since many of the unregulated activities of CP Limited had rates of return in excess of their cost of capital as referenced above, then

---

\* Exhibit R-4, p. 40.

it is my inference that the cost of equity funds is approximately 17.6%. This is based on the average of the two earnings yield figures for 1974 given in para. 5.28 (17.6 and 18.5), and a deduction of 0.5% for estimated upward bias ... (however) some of these companies (the unregulated activities of CP) are expected to earn in excess of their costs of capital. Therefore, it must be inferred that the cost of capital of C.P. Ltd. is in excess of the 17.6% lower-bound estimate presented above.\*

While accepting the manner in which the railway sub-mission described the relationship between "regulated" and "unregulated" activities of CP Limited, the sensitivity of this estimation procedure to the unknown values of 'c' and 'e' in particular, (i.e., percentage of retained earnings invested in restricted income service and shortfall in return of equity for restricted income services) and the difficulty of accurately estimating the amount by which the rate of return on the unregulated activities exceeded the cost of capital for CP Limited forced the Commission to rely more heavily on methods of removing the bias, before utilizing the E/P ratio as a means of measuring the cost of capital -- rather than adjusting the E/P ratio directly.

---

\* Ibid, pp. 42 and 43.



### Other CP Limited Relationships

The Provinces and the railways each computed an additional estimate of the cost of funds on common shareholders' equity based on specific relationships of CP Limited stocks to either government bonds or CP bonds. Since each of these computations was not adjusted nor recomputed by the other party nor by the Commission, they are separately reported in this short section.

CP Limited Average Premium Over Long-term Government Bonds: In computing the appropriate earnings/price ratio, the Provinces noted several factors that, to their analysts, suggested that the 1974 earnings/price ratio for CP Limited was abnormally high. To correct for this and any other randomness which might have influenced the earnings/price level of 1974, the Provinces asserted that:

if it is believed that the premium that Canadian Pacific Limited common commands over and above the government bond yield should be constant, then the difference between the earnings price ratio and the long-term government bond yield can be taken and averaged to eliminate randomness\*

---

\* Exhibit AMS-17, p. 132.

Applying this premium to the 1974 long-term government bond yield (8.9 percent) provides an estimate of the cost of equity funds rate of 11.0 percent.

CP Limited Premium Over CP Bonds: In a similar analysis of the difference between bond rates and equity rates, the railways inferred that the resulting equity rate for CP Limited would be 16.0 percent. This was based on the 1974 Collateral Trust Bond composite cost rate of 10.6 (actually 10.57) percent plus the long-term risk differential between bond and stock yields of 5.4 percent.

The former rate was that submitted by CP Limited to the CTC in May 1975 as part of the cost of capital approval process. The latter rate was based on the Ibbotson-Singuefield ("I-S") analysis of bond yields and the Fisher-Lorie ("F-L") analysis of stock yields.\* The railways did not advance this particular rate calculation as appropriate for the Commission's purposes but, rather, it is a result of the argument that they advanced in their Summary and Final Argument on Cost of Capital:\*\*

---

\* Transcript, Vol. 28, pp. 5681-5689.

\*\* Summary Final Argument of Canadian National and CP Rail, Cost of Capital Section, pp. 20-22.

In summary, the railways submit that spreads between rates of return on stocks and corporate bonds in both U.S. and Canadian markets clearly shows that Dr. Gordon's estimate of CP Ltd.'s cost of equity capital is unrealistically low.

In reporting this rate in the "railways" column, the Commission is merely interpreting the impact of this position on the cost of funds rate for equity which would have been implied. The rate is presented as a result of the argument not because the railways felt it appropriate specifically in this context.

Earnings Book Approximation: The use of the ratio of net earnings per share to the book value per share was introduced by the railways<sup>\*</sup> as a method of estimating the cost of equity funds rate for CP Limited. The earnings/book (E/B) ratios of comparable risk companies, as described earlier, were used to provide an estimate of the competitive rate of return that could be applied to the analysis of CP Limited equity costs. In using the approach, the railways concluded that:

---

\* Exhibit R-4, p. 34.

There may be discrepancies in the case of individual companies, or at particular points in time, but deviations will occur in both directions and the use of averages will tend to eliminate the effects of such deviations.

The chief theoretical objection to the use of comparable earnings rate is that the denominator in each computation is historical cost, rather than opportunity cost, and the former will be influenced by the age structure of assets, past price levels and similar factors. While there is no doubt that the effect of these differences is to create some margin of error about the resulting estimates, it does not show that estimates derived from sample means are systematically biased.\*

Under cross-examination, however, it was brought out that in another study,\*\* which examined the same technique of comparable earnings, the expert witnesses appearing here for the railways had expressed the reservation that comparable companies might earn more on their investment than their cost of capital with the result that the E/B ratios would overestimate the cost of capital. In that study, the Provinces felt that the quotation:

While it may be that the accounting vagaries  
'averaged out' over a sufficiently large sample

---

\* Ibid.

\*\* Exhibit R-60, "Competition, Economic Efficiency and Profitability in the Canadian Property and Casualty Insurance Industry," prepared by Dr. G. D. Quirin for the Insurance Bureau of Canada.

a careful study would probably show that this was not the case.\*

was contradictory to the submission made to this Commission:

While individual company figures may be influenced by peculiarities in accounting practices, these offset one another in a sample of sufficient size.\*\*

However, Dr. Quirin asserted that he had gone through the accounting characteristics of the individual companies in sufficient detail and:

convinced ourselves or me anyway that any additional peculiarities in accounting do in fact wash themselves out within that low risk spectrum of companies\*\*\*

In their rebuttal submission, the Provinces asserted, although earnings over book equity had been used at one time in regulatory proceedings, that:

earnings over book is unrelated to the cost of equity capital except by coincidence,\*\*\*\*

and that such a coincidence was absent in this study. The

---

\* Transcript, Vol. 33, p. 6399.

\*\* Exhibit R-30, page 26.

\*\*\* Transcript, Vol. 33, p. 6400.

\*\*\*\* Exhibit AMS-17, p. 133.

necessary coincidence was that actual earnings of the company and the required earnings of investors in the company must be equal. Further, the Provinces showed that, when actual earnings exceeded required earnings, the E/B ratio of the company would overstate the cost of funds, and when actual earnings were less than required earnings, the E/B ratio would understate the cost of funds.

The Provincial submission then stated that this bias could be corrected since the relationship of market price to book value would follow the pattern listed below:

---

<u>Condition</u>	<u>Bias in E/B</u>	<u>Relation of Market Price to Book Value</u>
Actual earnings = Required earnings	None	Price = Book
Actual earnings > Required earnings	Overstate	Price > Book
Actual earnings < Required earnings	Understate	Price < Book

---

Source: Exhibit AMS-17, p. 134.

---

In agreeing with the railways that the use of averages could tend to remove any directional bias, the Provinces noted:

However, it will only do so if the firms tend to be evenly drawn from all three categories or only drawn from the first category. For a sample of non-regulated companies one would not expect this



to be true. Successful non-regulated companies would be investing in projects yielding more than the cost of funds, would have price greater than book, and would have an earnings/book ratio greater than the cost of funds. The procedures Dr. Quirin employed to identify low risk companies were biased in favour of successful companies.

An examination of Dr. Quirin's quintiles 1 and 2 show that the market/book ratio is 1.82 for all companies and 1.94 for the non-utilities. Thus, the average earnings over book is very much of an overestimate of a cost of funds.\*

In order to use the E/B ratio at all, the Provinces suggest that an adjustment for market value and book value discrepancies needs to be undertaken. This adjustment involved regressing the return on book (column 5 of Schedule XII) against the ratio of market value to book value (column 6) for the comparable risk companies in Dr. Quirin's quintiles 1 and 2. This yielded the following results:\*\*

$$\frac{E}{B} = 0.1022 + 0.0439 \frac{\text{Market}}{\text{Book}} \quad (\text{Eq. 33})$$
$$(r^2 = 0.54) \quad (t = 8.65)$$

During cross-examination, Dr. Gordon admitted that in employing regression techniques with this data:

---

\* Exhibit AMS-17, p. 134; See Schedule XIII for data supporting this.

\*\* Exhibit AMS-17, p. 134.

We have the same problems in that the independent variable is subject to measurement error which creates some bias in the coefficient and we also have ratios on both sides and a common variable in the two ratios.\*

However, Dr. Gordon then went on to say:

If this procedure was the best estimate for arriving at the cost of equity capital, we might have used somewhat more care and tried to identify the bias and eliminate them more effectively. As I have indicated in my testimony, I not only would not recommend using earnings over price or return on book but I also would not advocate using them corrected in this way but the correction did do something about eliminating obvious biases in this type of data.\*\*

This exchange during cross-examination led the railways to argue:

it was made quite clear that the econometric problems associated with the so-called adjustments had not been addressed in any meaningful fashion by Dr. Gordon. The railways submit that his so-called adjustments are, therefore, meaningless.\*\*\*

Recognizing the shortcomings of using the E/B ratio and recognizing the potential bias in the use of the regression procedure, both the Provinces and the Commission recomputed

---

\* Transcript Vol. 32, p. 6129.

\*\* Ibid., pp. 6129-6130.

\*\*\* Summary and Final Argument of Canadian National and CP Rail, Cost of Capital Section, p. 22.

the estimate of the earnings book approximation submitted by the railways in Exhibit R-4. These recomputations are discussed in the following sections.

At this point, we should also state that we have little confidence in results derived from adjusted earnings/book ratios. With adjustment for discrepancies between market values and book values, we have somewhat greater confidence and, when based on information about a large number of comparable firms, we have even greater confidence. As stated earlier, however, these empirical results were used as support for our findings derived from relevant earnings-price information.

Canadian Regulated Company Sample, 1974: The six regulated companies referenced in the following section had the E/B ratios that ranged from 10.8 to 16.5 percent and averaged 13.87 percent (see Table XXXVI, following page). However, the market-to-book ratio for five of these six companies is greater than 1.0 and the average for the six companies

Table XXXVI		
1974 E/B and M/B Ratios of Six Regulated Companies		
Company	E/B Ratio	M/B Ratio
Bell Canada	11.4	0.90
Calgary Power	10.8	1.20
Consumer Gas	16.5	1.68
Northern & Central Gas	16.5	1.17
Trans Canada Pipelines	13.3	1.09
Union Gas	<u>14.7</u>	<u>1.44</u>
Average	13.87	1.2467
Source: Schedule XII.		

is about 1.23.\* Substituting this value in the Provincial regression equation (33) yielded a smoothed estimate of the earnings book approximation of 15.6 percent, a rate which according to the previous analysis overstates the cost of funds estimates.\*\*

---

\* The Provincial estimate of this number was 1.2162 but was derived from a slightly different data set than that shown in Table XXXVI. The average of these is about 1.23, i.e.,  $(1.2162 + 1.2467)/2$ .

\*\*  $E/B = 0.1022 + 0.0439 (1.23) = 15.6$ .

Comparable Risk Companies, 1973-74: Based on the analysis of risk described in the earlier section, the railways concluded that the average return on common equity for the first two quintiles was the appropriate estimate to apply to CP Limited. Also, the rates for 1973 and 1974 were averaged. This data is presented in Table XXXVI. From this, the railways concluded that the average rate of 17.4 percent "as the cost of equity capital for C.P. seems appropriate.\*

TABLE XXXVI			
Rate of Return on Average Common Book Equity as Related to Risk **			
Average for Companies	Average Percent Return		
	1973-1974	1973	1974
Quintile 1	16.8	16.6	17.1
Quintile 2	18.0	16.7	19.2
	17.4	16.6	18.2
**			
Rate of return on average common book equity is equal to the reported net income available for common per average number of shares outstanding during year divided by the average of beginning-of-fiscal year common book equity per share and end-of-fiscal year common book equity per share. Number of shares was adjusted to reflect the impact of a stock split(s).			
Source: Exhibit R-4, p. 59.			

\* Exhibit R-4, p. 38.

Comparable Risk Companies With M/B = 1 Adjustment: As described previously, the Provinces proposed to "make a rough adjustment for the overstatement present in these rates by determining what the return on book equity would be if the market value of the firm's equity equalled the book value.\* This "rough adjustment" was accomplished by solving the regression equation (33):

$$\frac{E}{B} = 0.1022 + (0.0439 \times 1.00) = 14.6\% \quad (\text{Eq. 34})$$

The Provinces conclude:

Thus, while we believe strongly that earnings over book is an irrelevant method for estimating the cost of funds if it were to be used, it must, at the very least, be adjusted by the procedure we have just described. Doing so changes the estimate arrived at using Dr. Quirin's Quintiles 1 and 2 from 17.4 percent to 14.6 percent.\*\*

Any reliance on this technique was flatly rejected by the Provinces:

Earnings over book has no place in a modern discussion of cost of funds, and we reject Dr. Quirin's use of it as a measure of the cost of equity funds.\*\*\*

---

\* Exhibit AMS-17, p. 134.

\*\* Ibid., p. 135.

\*\*\* Ibid.



The Commission reviewed the use of the earnings/book ratio and agreed with the Provincial qualification regarding the market-to-book ratio. As a further review, the Commission calculated the simple average E/B ratio of the 21 companies (see listing in Table XXXIII) from quintiles 1 and 2 which had market/book ratios within 20 percent of 1.0. The high and low E/B's for this group were 26.0 percent and 8.5 percent with an average of 14.6 percent, providing good corroboration for the result obtained in the Provincial analysis.\*

CP Limited, 1974: In cross-examination of Dr. Quirin, the Provinces asked if the witness could put on the record the earnings over book ratio for CP Limited for the same period (1973-74). When it was suggested to him that it would be something under 10 percent,\*\* Dr. Quirin agreed that this was probably correct. In their summary submission, the Provinces pointed out to the Commission:

---

\* For the 11 companies with market/book ratios within 10 percent of 1.0, the high and low E/B's were 22.2 and 8.5 with an average of 13.1 percent.

\*\* Transcript, Vol. 10, p. 1857.

It should be noted in this context that CP Ltd.'s return on book in 1974 was approximately 10 percent.\*

From the data contained in Schedule X it can be seen that the unadjusted E/B ratio for 1974 was 10.5 percent and for 1973 was 7.1 percent. If the adjustments for National Transportation Act payments were made to this data, the comparable ratios would be 11.0 percent for 1974 and 7.3 percent for 1973. During both of these years, the market to book ratio for CP Limited was well below 1.0. According to the argument advanced by the Provinces, this implies that the E/B ratio of CP Limited understates the actual cost of funds rate. If we insert the 1974 CP Limited market/book ratio in the Provincial estimating equation (33), we obtain the following E/B estimate:

$$\frac{E}{B} = 0.1022 + (0.0439 \times 0.584) = 12.8 \quad (\text{Eq. 35})$$

The use of the CP Limited 1974 E/B ratio was rejected on two grounds -- one, that E/B ratios contain biases, and two, the 1974 CP Limited results were atypical.

---

\* Submission of the Provinces of Alberta, Manitoba, and Saskatchewan on capital costs, p. 20.

## Other Regulatory Decisions

The fourth method advocated by the railways as a means of deriving costs of common equity was a comparison "with rates of return on common share equity allowed by various regulatory agencies in respect to utility companies under their jurisdiction."\*

U.S. FCC Allowance Applied to CP Bonds: The railways cross-examined Dr. Gordon about the relationship between the market value to book value ratio of American Telephone & Telegraph Company, its relative level of riskiness and the recent Federal Communications Commission decision (February 1976) regarding the allowed rate of return for the Long Lines Division of AT&T.\*\* While noting that this decision was only directed towards some 20 percent of the consolidated entity of AT&T., Dr. Gordon did generally agree that the FCC met his earlier requirement that the regulatory rate decision should be arrived at in a reasonable manner:

Q. (Dr. Quirin) But the F.C.C. does try to set allowed returns appropriately equal to cost of capital?

A. (Dr. Gordon) Yes, I would say they are a pretty good regulatory agency. I am really familiar with the staff. I do not keep up with the changes in the Commission and I really cannot comment on the quality of

---

\* Exhibit R-4, p. 44.

\*\* Transcript, Vol. 32, pp. 6117-6125.

that Commission right now.\*

During the course of this cross-examination, it was brought out that the allowed rate of return on AT&T. common at 12.4 percent was exactly 4.0 percent higher than the 8.4 percent yield on the long term bonds of AT&T. While suggesting that "it would seem like a large spread in my judgment,"\*\* Dr. Gordon agreed that, under certain conditions, one could use this information to infer a risk premium, since he "looked at the A.T.&T. bonds as pretty close to a risk-free rate."\*\*\* Since at that time the market-to-book ratio of AT&T. was close to 1.0, which implied that investors were expecting AT&T. to earn a rate of return on common equity equal to its cost rate,\*\*\*\* this supported Dr. Gordon's criterion that the cost of capital had been appropriately determined.

---

\* Ibid., p. 6119.

\*\* Ibid., p. 6121.

\*\*\* Ibid., p. 6122.

\*\*\*\* Ibid., p. 6118.

Earlier, Dr. Gordon had agreed that CP Limited common shares represented a riskier investment than did the common shares of American Telephone and Telegraph Company.\* From this, the railways argued, in their summary submission, that "This implies that CP Ltd. should have a higher risk premium than A.T. & T."\*\*

Based on this evaluation and on the fact that CP Limited bonds do not represent a pure risk-free investment, the Commission concluded that the application of a four percent risk premium to the 1974 bond rate represented a reasonable estimate of the appropriate equity rate. The McLeod, Yond, Weir Index of Industrial Bonds for the end of 1974 indicated that the yield on CP long-term bonds was about 10.7 percent.\*\*\* From this we calculated the estimate of 14.7 percent shown in Schedule IX.

Canadian 1974 Allowed Rates: The railways submitted the evidence contained in the first three columns of Table XXXVII (following page). They noted that some agencies provided for a return on deferred taxes, which required an adjustment to the allowed rate of return. In advocating the use of this

---

\* Ibid., p. 6117.

\*\* Summary and Final Argument of Canadian National and CP Rail, Cost of Capital Section, p. 21.

\*\*\* Transcript, Vol. 32, p. 6123.

TABLE XXXVII  
OTHER CANADIAN REGULATORY PROCEEDINGS 1974-1976  
- ALLOWED RATES OF RETURN AND BASIC STOCK INFORMATION

(1) <u>Company</u>	(2) <u>Regulatory Agency</u>	(3) <u>Equity Return Allowed</u>	(4) <u>Equity Return Actual**</u>	(5) <u>Earnings Price Ratio</u>	(6) <u>Market Book Ratio</u>
Bell Canada	Canadian Transport Commission	12.00%	11.4%	13.2	0.90
Calgary Power	Alberta Public Utilities Board	15.00	12.5-	11.1	1.20
Consumers Gas	Ontario Energy Board	14.00	15.5	10.0	1.68
Northern & Central Gas	Ontario Energy Board	14.38*	17.8	14.0	1.17
Trans Canada Pipelines	National Energy Board	16.67	12.9	12.2	1.09
Union Gas	Ontario Energy Board	15.00*	13.4	10.4	1.44
Average		14.51	13.9	11.82	1.2437

\* Includes adjustment for return allowed on deferred taxes.

\*\* Earnings on common in 1974 divided by average of start and end of year book value per share.

Source: Exhibit R-4, page 62, Exhibit AMS -17, pages 142 and 143, Exhibit AMS-24, and Workpapers of Dr. Quirin.



guideline, the railways cautioned that these six companies were of significantly lower risk than CP Limited.\* Additionally, they pointed to the fact that the shares of Bell Canada were selling below book value (market-to-book ratio of 0.90)

indicating that the expected rates of return are below costs of capital as perceived by the market. It would accordingly be much safer to make comparisons with the provincially regulated utilities.\*\*

Under cross-examination,\*\*\* Dr. Quirin added qualifications to the allowed rates for Calgary Power ("there is a significant factor in there for working capital allowance... and the company does not have and has not had positive working capital for several years"); for Consumers' Gas ("it has a very large oil and gas producing subsidiary called Home Oil which influences presumably the price at which it sells"); for Union Gas ("it again has sort of

---

\* At pages 37 and 38 of Exhibit R-4, the railways state that, based on the five risk measures, CP Ltd. would rank about 21st, but that due to substantial political/regulatory risk the company more appropriately belongs in the second quintile. In comparison to the listing of Schedule XIII the placement of CP Limited at 21st position would rank it more risky than five of the six utilities. Moving CP Limited to the second quintile would then rank it more risky than the sixth utility: Trans Canada Pipelines.

\*\* Exhibit R-4, p. 44.

\*\*\* Transcript, Vol. 10, pp. 1866-1884.

working capital peculiarities as well but I don't think they account for all of it"); and for Trans Canada Pipelines ("but I believe at the present time Trans Canada is selling at a discount below book value"). The extent of these restrictions and interpretations led the Provinces to conclude in their Summary Submission that:

In fact there are so many qualifications to the comparison used by Dr. Quirin that this evidence must be given little or no weight.\*

After correcting for the allowed return on capital represented by deferred taxes and after allowing for the "significantly lower risk" of the six regulated Canadian utilities in comparison to CP Limited, the railways concluded:

Many of these are allowed rates of return on equity in the 14.0 - 15.0% range or more. Given the relatively higher risk of CP Ltd., a rate of return in the 17.0 - 18.0% range seems quite reasonable.\*\*

The railways, quite clearly, did not advance the allowed rates from other jurisdictions as direct evidence of CP's cost of capital but did argue that it did "have evidentiary value as to costs determined by regulatory agencies for companies which are generally of significantly lower risk than CP."\*\*\*

---

\* Submission of the Provinces of Alberta, Manitoba and Saskatchewan, Cost of Capital Section, p. 20.

\*\* Exhibit R-4, p. 45.

\*\*\* Exhibit R-30, p. 26.

In rebuttal, the Provinces pointed out that it was only appropriate to use decisions of other regulatory agencies if their determinations were arrived at in a reasonable manner and if the company under study (such as CP Limited in this case) was similar to the other regulated industries included in the comparative sample. Furthermore, they argued that the ratio of market value to book value of the shares of a regulated company was a good indicator of the appropriateness of the decision of the regulatory agency:

If a company is expected to earn a rate of return equal to its cost of capital, it should have a market value equal to its book value. On the other hand, if the market value is above, the book value, it indicates that investors expect the firm to earn a return in excess of the cost of funds.\*

The Provinces, having qualified the circumstances in which the use of other regulatory decisions was appropriate, utilized the same data as the railways and arrived at the average allowed equity return of 14.5 percent. When further information regarding the relevant actual rates of return (Column 4) and market-to-book ratios (Column 6) was added to the analysis, (Table XXXVII) the Provinces concluded:

A premium of over 20 percent is strong evidence that 14.5 percent is too high an estimate of the

---

\* Exhibit AMS-17, p. 136.

cost of equity capital for these firms. In addition, in five out of six cases, the actual return is below the allowed rate indicating that the allowed rate probably overestimates the investors expectations about the real future return. Once again, the 14.5 percent overstates the cost of funds.\*

When questioned by the Commissioner, both expert witnesses agreed that the approach they had adopted did not interpret the proceedings of this Commission as if grain transportation were an industry subject to rate of return regulation. In fact, both were very emphatic that the estimated cost of equity rate that they had developed was the correct figure regardless of whether the industry was subject to rate of return regulation, some other form of regulation or was deregulated.\*\* In the view of the railways, however, this did not negate the use of approved regulatory rates of return as indicators of capital attraction rates that may be associated with the transportation of grain.

We recognized that we were not conducting a regulatory Inquiry and that we were not determining an "allowed" rate of return. Also, we recognized that sole reliance on this

---

\* Exhibit AMS-17, p. 136. According to the Workpapers of Dr. Quirin and the information on actual returns submitted by the Provinces in Exhibit AMS-24, Consumers Gas and Northern and Central Gas both earned in excess of their allowed rates of return on common equity, so that the Provincial reference should be to "four out of six cases."

\*\* Transcript, Vol. 35, pp. 6668-6670.

technique gives rise to circularity in the decisionmaking of such tribunals, and that the outcome of this and the Grain Handling and Transportation commissions could ultimately affect the risk and resulting cost of capital rates for transporting grain by rail.

The Commission agreed with the railways that the decisions of other regulatory bodies were indicative but not conclusive of the appropriate equity funds rate to be estimated by this Commission. Nonetheless, we did accept this estimated rate of 14.5 percent as both representative and supportive of the rates determined by other methods.

#### Informed Judgment of Investment Dealer

In support of their initial presentation to this Commission, Canadian Pacific Limited and Canadian National presented the submission (Exhibit R-3) and testimony of Mr. James Pitblado on the Cost of Common Equity Capital to Canadian Pacific Limited. Mr. Pitblado's qualifications related to the area of corporate underwriting, including the underwriting and marketing of new issues of securities, for a major Canadian investment dealer. As referenced on page 2, line 6, of Schedule IX, Mr. Pitblado considered that an after income tax rate of return on common equity of 15.0 to 20.0 percent would be required to adequately compensate the investor in CP Limited.

---

\* Transcript, Vol. 32, p. 6123.



The approach utilized by Mr. Pitblado relied heavily on his subjective analysis of the required compensation for capital invested in railway transport facilities. To establish this, he examined ten-year data on dividend yield and growth in earnings per share for a selected group of successful, nonregulated companies to calculate the potential investment returns available to common equity investors in the domestic Canadian capital market. To supplement this, he also examined rates of return granted in recent regulatory decisions, and investment returns available from alternative financial instruments. From all of this he concluded:

Based on the record of growth in consolidated earnings in recent years, and the current price of the shares of CP Limited in relation to earnings and dividends, a rate of return on common equity invested in rail facilities approaching 20 percent would not appear unreasonable when the substantial business and financial risks involved in railway operations are taken into account.\*

The Provinces did not introduce comparable evidence of an investment dealer, but in rebuttal contended that:

All these reasons indicated that Mr. Pitblado's estimate of what stockholders might reasonably expect in the future is excessive.\*\*

The Commission, similarly, did not include additional analyses by other investment dealers in its cost determinations.

---

\* Exhibit R-3, p. 19.

\*\* Exhibit AMS-17, p. 138. These reasons refer to the inclusion in the comparative earnings growth figures of inventory profit, inadequate depreciation in inflationary periods, extraordinary oil company profits, and rate increases allowed by regulatory agencies.



While appreciating that this evidence was substantially subjective in nature, this Commission could not agree with the conclusions regarding risk which led to the suggested 15.0 to 20.0 percent estimates. The evidence developed elsewhere by the Commission and the parties was far more conclusive in this regard and pointed to a rate below this range.

#### Capital Asset Pricing Model

The introductory discussion of methodological approaches revealed that the Provinces' CAPM developed the following expression (equation (26)) to compute the cost of equity capital for CP Grain:

$$R_j = R_f + (B_j/B_k)(R_k - R_f)$$

where

$R_j$  = expected return required to invest in CP Grain

$R_f$  = expected return from risk-free assets

$R_k$  = expected return required to invest in CP Limited

$B_j$  = relative risk differentiating CP Grain from the market

$B_k$  = relative risk differentiating CP Limited from the market

To develop an estimate of the cost of equity capital for CP Grain, the following input values were used:

$$R_k = 0.13$$

$$B_k = 1.10$$

$$B_j = 0.32$$

$$R_f = 0.089$$

This latter rate, the long-term government bond rate in 1974, was used because:

For the risk-free rate, the CAPM theory states we should use the short-term government bill rate. However, the empirical work on CAPM results in an intercept that is frequently somewhat higher than the short-term government bill rate.\*

Substituting these values we obtain the estimate of the cost of equity capital for CP Grain:

$$R_j = 0.089 + (0.32/1.10)(0.13 - 0.089) = 10.1\% \quad (\text{Eq. 36})$$

According to the CAPM theory, this is the cost of equity funds for CP Grain as calculated for a capital structure containing no debt. In order to account for

---

\* Exhibit AMS-17, p. 152.

the risk imparted to equity due to the existence of some debt in the enterprise, this figure was adjusted upward. Since the traditional approach and the approach of Modigliani and Miller, as described previously, represent the two extremes, the Provinces held that the M & M model can be applied to develop "an upper limit on the estimated cost of equity capital for CP Grain."\*

According to the M & M model, the cost of equity capital can be represented by:

$$k = o + (o - r) (1 - t) \frac{D}{E} + (o - r) \frac{P}{E} \quad (\text{Eq. 37})$$

where k = cost of equity capital

o = cost of equity capital for a firm financed by equity

r = rate of interest on debt

t = corporate tax rate

D = market value of firm's debt

E = market value of firm's common equity

P = market value of firm's preferred stock (note that D, E and P may be expressed as percentages of the total capital structure, since they are all used in ratios)

All of this information has been discussed previously except "r." For 1974, long-term government interest rates

---

\* Ibid, p. 155.

were 8.9 percent, while long-term Provincial and industrial bond rates were between 9.9 and 10.2 percent:

Given the low risk of CP Grain a borrowing rate closer to the government's rate would be appropriate, and a rate of 9.4 seems reasonable.\*

By substitution of this value in the above equation, at the Corporate tax rate for CP Limited of 52.5 percent, and based on the Provinces' imputed capital structure of 60 percent debt, 5 percent preferred and 27.5 percent common stocks,\*\* the following estimate is obtained:

$$k = 10.1 + (10.1 - 9.4) (1.0 - 0.525) \frac{60.0}{27.5} + (10.1 - 9.4) \frac{5.0}{27.5}$$
$$= 10.1 + 0.73 + 0.13 = 11.0\%$$

The Provinces, in developing this cost of equity funds estimate, reiterated that it represents an upper limit: i.e., it represents the upward adjustment of the 10.1 percent "to the largest degree supportable by theory (the Modigliani-Miller theorem on the subject).\*\*\* This estimate was not subsequently used by the Provinces in their computation of the cost of funds rate, but was used to corroborate their ultimate choice of 11.5 percent:

---

\* Ibid.

\*\* It will be recalled that the remaining 7.5 percent is the amount of deferred taxes.

\*\*\* Exhibit AMS-17, p. 156.

Therefore, the 11.5 percent figure arrived at by judgmental analysis in Exhibit No. AMS-2 is greater than the figure arrived at through the direct application of the best available techniques on the subject.\*

As evident from previous parts of this chapter, the railways did not utilize this approach in developing their cost of equity funds rate. Under cross-examination, the railways particularly rejected the use of this procedure (CAPM) when dealing with a single company:

THE COMMISSIONER: Am I also correct, Dr. Quirin, that your reluctance to use the results of the capital asset pricing model increases as the number of companies in the portfolio you are testing decreases?

DR. QUIRIN: Yes, sir. ...I would think that where we are dealing with things that have large portfolios .... I would be happier using it than I would be with single industrial companies or even single public utilities.\*\*

Also, Dr. Quirin expressed his dissatisfaction with the CAPM because "it simply assumes in its form that the third moment or the skewedness coefficient does not matter in the formation of prices."\*\*\* According to Dr. Quirin, this failure means that for a company which is involved in "an unfair gamble like grain" the behaviour of the firm would appear to be contrary to one of the underlying principles of

---

\* Ibid.

\*\* Transcript, Vol. 36, pp. 6960 and 6961.

\*\*\* Ibid., p. 6948.

the CAPM theory.\* The application of the model in such an instance would tend to misstate the cost of equity rate.

The Commission rejected this approach to the development of the cost of equity funds rate, based on its previously detailed criticisms that:

- the capital structure advocated by the Provinces for CP Grain was inappropriate
- evidence that the risk of CP Grain differed from CP Rail and CP Limited were inconclusive

Finally, we agreed with the railways that the process of developing market betas from earnings and physical betas was subject to sufficient error that it was unreliable and that the use of beta measurements of systematic risk for a single security was also susceptible to error:

THE COMMISSIONER: Is it true that the imperfection, the potential error in the imperfection is substantially increased when you are doing a single stock beta as opposed to a portfolio analysis?

DR. ELTON: Yes, it is substantially increased.\*\*

---

\* Ibid., p. 6949.

\*\* Ibid., Vol. 36, p. 6958.



### Comparable Industry

As detailed earlier, considerable evidence and questioning surrounded the capital structure appropriate to this Inquiry. In supporting their contentions, the Provinces introduced data relating to the book value and market value capital structures, interest coverage ratios, return on capital and return on common equity of fifteen corporations representing three industry types, namely: Canadian utility, U.S. electric power and U.S. railroad (5 of each).<sup>\*</sup> They noted that a major cause of the capital structure differences was the significant difference in rates of return, i.e., higher debt ratios generally were associated with higher profitabilities. In their rebuttal, the railways compared the capital structure of CP Rail with all solvent U.S. Class I line haul railroads.<sup>\*\*</sup>

Solvent U.S. Railroads and U.S. Investor-owned Electric Utilities: In examining this area further, the Provinces introduced comparative data for all nonbankrupt Class I U.S. railroads and all investor-owned electric utility companies. As shown in Table XXXVIII (following page), these data showed the

---

<sup>\*</sup> Exhibit AMS-17, pp. 109-111, reproduced as Schedule XIII.

<sup>\*\*</sup> Exhibit R-30, pp. 34-37.

<sup>\*\*\*</sup> Exhibit AMS-25, reproduced here as Table XXXVIII.

TABLE XXXVIII

Comparative Capital Structures  
and Rates of Return for Solvent U.S. Railroads  
and All U.S. Investor-owned Electric  
Utility Companies 1/  
(000,000)

	Electric Utilities		Railroads	
	Amount	Fraction	Amount	Fraction
Debt	\$ 56,673	.52	\$ 9,129	.36
Preferred	13,089	.12	468	.02
Common Equity	38,567	.36	15,486	.62
TOTAL	\$108,329	1.00	\$25,083	1.00
Interest on Debt	\$ 3,203		\$ 422	
Preferred Dividends	790			
Earnings on Common	4,196		666	
Earnings after Taxes	\$ 8,189		\$ 1,088	
After Tax Return on Capital	7.56%		4.34%	
Return on Common Equity	10.9%		4.1% <u>2/</u>	

1/ Based on December 31, 1973 balance sheet and 1973 income statements.

2/ Based on the assumption that the dividend on the preferred was 8%.

Source: Exhibit AMS-25.

return on common equity to be 4.1 and 10.9 percent respectively for the solvent U.S. railroads and the U.S. investor-owned electric utilities. From this comparison, the Provinces concluded that the electric utilities have substantially higher debt ratios, after tax returns on capital and return on common equity\* which supported their earlier conclusion that "an appropriate debt ratio increases with the company's EBIT as a percent of total capital."\*\*

Neither the railways nor the Commission altered this calculation. Note that this result was a by-product of an analysis of capital structures prepared by the Provinces and was not advanced by the Provinces as the appropriate rate of return on common equity for CP Grain. However, the data were available as part of the Provincial presentation and for the sake of dissemination of information it has been included in this phase of the Commission's analysis.

Six Canadian Utilities,  $M/B = 1.2162$  in E/P Regression: In examining the rates of return earned by the six Canadian companies under regulatory control as referenced by the railways,\*\*\*

---

\* Transcript, Vol. 32, p. 6028.

\*\* Exhibit AMS-17, p. 97.

\*\*\* Exhibit R-4, p. 62.

the Commission was interested to note the effect of adjusting the earnings/price ratio for differences in market-to-book ratios. As stated earlier, the Provinces noted that the ratio of market-to-book, in 1974, for the six firms listed in Exhibit R-4, was 1.2162 and concluded that this was strong evidence that the average allowed equity return under regulation was too high as an estimate of the cost of equity capital for these firms.

To perform this adjustment, the Commission began with the relationship (equation (28)) between the earnings/price ratio of the market value of the company's equity to its book value, as developed by the Provinces<sup>\*</sup> for all companies in quintiles 1 and 2 (all six regulated companies were included in this group). By substituting the market-to-book value of 1.2162 in this equation, the Commission computed the adjusted earnings/price ratio of 13.4 percent for these six companies and included this as an input to the decision regarding the appropriate capital funds rate for this Inquiry.

### Summary and Findings

The Commission reviewed all of the tests proposed for estimation of an equity funds rate for CP Limited appropriate to

---

\* Exhibit AMS-17, p. 131.

the traffic at issue. We concluded that the information available from the discounted cash flow model was most appropriate and the information derived from a proper examination of earnings/price ratios was of paramount significance within that larger paradigm. For that estimation, we placed more confidence in longer term, averaged and trended results than we did in the results of a single year or changes from only one year to the next. Also, we placed greater confidence in results incorporating the characteristics of many rather than one firm. Finally, we viewed 1974 as somewhat atypical for CP Limited and used that interpretation to guide our choice of tests.

We have concluded that the cost of common equity capital for CP Limited (Consolidated) was appropriate for costing the transportation of grain by rail for this Inquiry and was most accurately estimated at 14.5 percent for the year 1974.





## CHAPTER IX

### CANADIAN NATIONAL'S CAPITAL FUNDS COST

Four general questions were raised by the Commission and the parties relevant to the determination of capital costs for Canadian National. They were:

- What was the appropriate gross investment base for computation of depreciation expenses?
- What were the appropriate depreciation rates for development of depreciation expenses?
- What was the appropriate net investment base to utilize in the development of capital funds costs?
- What was the appropriate cost of funds rate to apply to the investment base for the computation of capital funds costs?

#### CN Gross Investment Base

The parties generally agreed that under current circumstances, the book values of CP Rail's fixed assets (such as roadway, stations, signals, etc.) should form the basis for computation of Canadian National's depreciation expenses for these property items. And the book values of Canadian National's movable assets (such as locomotives, cars, work equipment, etc.) were appropriate to determining Canadian National's depreciation expenses for these units of investment. The only exceptions to this general agreement were the values appropriate to stations on grain dependent

lines, the value of track and roadway investments in grain dependent lines and the values of investment in some older box cars principally utilized in grain transportation. These areas of disagreement were equally directed towards CP Rail. The core of the disagreement in these areas arose from the usefulness and relative ages of the particular assets under consideration. The Provinces argued that the stations were not necessary for the transportation of statutory grain and as such should not represent a depreciable expense in the computation of grain costs. Both track and roadway investments in grain dependent lines and investment in older box cars were viewed, by the Provinces, as investments in assets which had been fully depreciated and contained no investment value for the calculation of depreciation expenses. A fuller discussion of these issues is contained in the last chapter of this Technical Appendix.

#### CN Depreciation Rates

There was no disagreement among the parties with respect to the appropriate depreciation rates for individual asset groups. The depreciation rates for each asset group represented in the primary property accounts of the railways were those submitted by the railways to the Canadian Transport Commission and accepted by the CTC for costing

purposes.\* The depreciation expenses used by this Commission, the Provinces and the railways were computed by the application of these depreciation rates to the relevant gross investment base.

#### CN Net Investment Base

The same three areas of disagreement existed between the Provinces and the railways with respect to the appropriate net investment base as existed with respect to the gross investment base. Essentially, the Provinces argued that, because the stations were not used or useful for the transportation of grain, they should not be included in an appropriate investment base for the development of capital funds costs. In this regard, they viewed any remaining book value and resulting capital costs for these assets in the same way as the wages of firemen -- that is, as a system constant expense. The Provinces argued that the units of investment contained in the track and roadway property accounts, representing assets situated on grain dependent lines, were "fully depreciated" and as such their remaining net asset value was equal to their salvage value. In the same manner, the Provinces argued that the remaining investment in some

---

\* Implicit in the acceptance of these rates is the acceptance of estimated service life for the items of that property group, the estimated salvage value, and the resulting annual depreciation rate.

of the older box cars used in grain transportation was zero. Again, the railways took the opposite view to this approach and computed their estimated costs accordingly. As discussed in the last chapter of this Volume, the Commission was in agreement with the Provincial approach for station investment, but disagreed with this technique for evaluating older assets.

#### Canadian National's Capital Funds Cost

An area of much controversy was related to the development of the appropriate cost of funds rate for Canadian National. The railways argued that the appropriate rate was that which was found to be applicable for CP Rail. The railways used CP's cost of funds rate throughout, because of the absence of market data for CN equities and the fact that the interest rate on CN debt is influenced by the Federal government guarantee and not by the nature of CN itself.

In effect, the CP cost rate is used as a measure of the opportunity costs to society of the funds invested in CN.\*

---

\* Exhibit R-30, p. 44.

United Grain Growers (UGG) largely supported the approach of the railways and concluded:

The use of CP Rail's cost of capital for CNR is prescribed by law. As such, it is beyond the purview of this Commission to use differing costs of capital for the two railways.\*

The UGG view was based on the long standing principle of using CP as the "yardstick" for cost of capital considerations.

The Provinces argued that the appropriate rate was the government interest rate on the funded debt of Canadian National because:

CNR is a Crown corporation and, for a Crown corporation, the cost of capital is the imbedded interest rate on its outstanding debt.\*\*

In summary, the railways (and United Grain Growers) argued for the use of opportunity costs, while the Provinces (and others) contended that the costs should be related to the source of the capital funds where appropriate. The two positions were dependent on differing interpretations of the following three issues:

- commercial status of Canadian National

---

\* Exhibit UGG-2, p. 14.

\*\* Exhibit AMS-1, p. 82.

- applicability of the "yardstick" railway concept
- opportunity cost vs. actual costs.

Rather than dealing with each of these as a separate discussion, the remainder of this section will trace through the positions of each of the parties on these issues. It should be apparent to the reader which of the issues is being discussed.

#### Provincial Submission

The cost of funds rate for Canadian National advanced by the Provinces was 5.94 percent - the embedded interest rate for year 1974 on the CNR debt. This rate was computed from the debt and interest charge data contained in the annual report of the company to the CTC<sup>\*</sup> as shown in Table XXXIX (following page). The computations on Table XXXIX involve the development of an adjusted average long-term debt. The adjustment process began with the total end of year long-term debt of \$1,894,411,300 for 1973 and \$1,890,841,900 for 1974 as

---

\* Annual Report of the Canadian National Railways to the Railway Transport Committee of the Canadian Transport Commission and Statistics Canada, Ottawa, for the Year Ended December 31, 1974.



Table XXXIX

IMBEDDED INTEREST RATE ON CNR DEBT - 1974

	<u>As at December 31 in Thousands</u>	
	<u>1973</u>	<u>1974</u>
Long term Debt	\$1,894,411.3	1,890,841.8
Less: Amounts Payable to Affiliated Company	15.5	15.5
Interest Free Government Loans	<u>16,983.8</u>	<u>16,983.8</u>
Long term Debt-Adjusted	<u>1,877,412.0</u>	<u>1,873,842.5</u>
Average Long term Debt	<u>\$1,875,627.2</u>	
Interest Paid in 1974 on this Debt	<u>\$111,455.6</u>	
Imbedded Interest Rate	<u>5.94%</u>	

Source: Exhibit AMS-1, page AMS-N8.1

reported to the CTC for the following categories of debt:

Account No.	Description	<u>Year End (000)</u>	
		<u>1973</u>	<u>1974</u>
765	Funded Debt	\$ 805,498.3	\$ 598,252.8
765A	Loans from Gov't of Canada	1,088,897.5	1,292,573.6
769	Amounts Payable to Affil. Co.	<u>15.5</u>	<u>15.5</u>
	Total Long-term Debt	\$1,894,411.3	\$1,890,841.9

From this total, the Provinces deducted the \$15,500 payable to the Shawinigan Falls Terminal Railway Company (equally owned by CN and CP) and the \$16,983,762 Interest Free Advances to the Canadian Government Railways for Working Capital, to arrive at the adjusted long-term debt. The adjusted 1973 and 1974 year-end amounts were then combined to develop the average debt for the full year 1974. This amount became the denominator to the "Interest paid in 1974 on this Debt" shown in Table XXXIX.

The amount of interest paid is \$111,455,600 as shown in Schedule 14 of the Annual Report to the CTC, at Account 546C. It includes the current accruals of interest on all classes of long-term debt whose principal is recorded in accounts 765, 765A, 766 and 769, and interest accruals on debenture stock. Omitted from this definition of interest paid is the interest on unfunded debt (Account 547C) arising from short term notes payable on demand, interest on deferred payments for public improvements and other analogous items. The effect of including these items in the computation would be to increase the embedded interest rate from 5.94 percent to 6.44 percent.

In support of the 5.94 percent capital funds rate for Canadian National, the Provinces submitted that, unlike a private

corporation which requires an equity portion in its capital structure to reduce the risk and interest rate attached to debt, a Crown corporation enjoys debt guaranteed by the government. This guarantee is without cost to the Federal government and removes the need for the risk-reducing equity in the capital structure. This means that, by recovery of the interest on the debt capital invested in the company, the government will achieve the appropriate return for the Crown corporation and the government will be indifferent to its continued operation (with respect to this decision parameter). It also follows that no equity is required in a Crown corporation

During cross-examination, Dr. Gordon further elaborated on the Provincial position:

(MR. PYE) I take it from your answers to date that you would certainly agree that there is a possibility that a Crown Corporation may have equity in its capital structure simply because the government decided to finance it with equity funds, is that right?

(DR. GORDON) The government can borrow \$1 million and give it to this company and call it equity but the term is meaningless in the context of a government corporation. The cost of capital is the rate of return the government requires on the funds it provides and what the government calls these funds may just reflect a fashion or abstract notion but it has no economic context or meaning.

(MR. PYE) And is that rate of return measured by its own interest costs?

(DR. GORDON) The rate of return that the government requires is what it requires and in many circumstances and as I infer it, it has a dual relationship with CN. There is capital which it guarantees and which it provides at the interest rate at which it borrows and then in addition to that it covers annual deficits.\*

In some instances a fund or reserve is established to overcome the necessity of borrowing to offset operating losses and:

This equalization reserve is sometimes called equity. However, it need not be large in order to serve the intended purpose, and since the reserve is provided by consumers, it need not earn a return.\*\*

Under cross-examination, Dr. Gordon agreed that the Hydro Electric Power Commission of Ontario had such an equalization reserve to cushion differences between revenue and expense and that this may have been called equity capital. During this exchange,\*\*\* the railway representatives introduced evidence that Eldorado Nuclear Limited, a Crown corporation, had a capital structure which contained common share equity representing 43 percent of the total. Canadian Overseas Telecommunications Corporation, a Crown corporation

---

\* Transcript, Vol. 11, p. 2067.

\*\* Exhibit AMS-1, p. 83.

\*\*\* Transcript, Vol. 11, pp. 2066-2073.

with about two-thirds of its capital in the form of common shareholders' equity and Alberta Government Telephones, a Provincial Crown corporation with less than 10 percent of its capital in shareholders' equity, were also cited as cases where a Crown corporations had equity capital in their overall structures.

The Provincial position also noted that the case of donated capital provides the second situation which may give rise to a notion of equity for a Crown corporation. This situation arises when the corporation, for some reason, undertakes investments that are not expected to earn a positive return and some authority (not necessarily the corporation) may need to offset the operating deficit.

This donated capital may be called common or preferred equity for political reasons, but its zero or negative return should not be averaged in with the other assets to arrive at the cost of capital.\*\*

The use of the Government's interest cost for CN was further supported by refutation of the argument that it would be inefficient for the Government to earn less than investors would earn if the same corporation were investor-owned. Here the Provinces submitted:

---

\* Ibid.

\*\* Ibid.

If the Government were simply interested in earning on the capital it invests what private investors earn, it would buy the securities of investor-owned companies. Why establish a Crown corporation.\*

This position was carried further by reference to the fact that some Crown corporations generate profits and others operate at a loss. The important determining factor was the Government's perception of the public interest.

However, in the absence of explicit or implicit information to the contrary, it would appear that Government policy is to have the corporation operate at zero profit after covering the interest on its debt.\*\*

In this regard, Dr. Gordon stated that the intent of Government was more clearly seen through its actions than through its legislation:

I can only infer that the government had other objectives than making a profit through the continued operation of the Canadian National Railways, other objectives in the acquisition of the Canadian National Railways or the constituent railways and other objectives in continued operation. Otherwise, it would be a remarkable phenomenon.

(and)

...if the government's attitude towards CN was

---

\* Exhibit AMS-1, p. 83.

\*\* Ibid., p. 84.



exactly the same as the attitude of private investors towards CP, CN would be long gone.\*

In supporting the rate of 5.94 percent, the Provinces rejected the railway's proposition that Government ownership does not eliminate risk. Quite simply, the Provinces argued that individuals do not recognize their pro rata share of the government's wealth or debt in estimating their private wealth. Ergo, the size or nature of the Government's financial position does not impact on the risk of a taxpayer's net worth. During cross-examination on this matter, Dr. Gordon stated:

It is completely incorrect to go from an investor-owned corporation to a government-owned corporation and say that the same risk exists....

I do not see the taxpayers of Canada perceiving this as a risky situation and advocating that the government not make the investment. They may want to earn that extra return. If they do, that is a matter of policy.\*\*

---

\* Transcript, Vol. 11, pp. 2065 and 2066.

\*\* Ibid., pp. 2075 and 2076.

Finally, the Provinces recognized that it may be appropriate to assign CP's cost of funds rate to CN when the objective was to avoid coming up with cost figures for CN that were lower than the comparable CP figures just because of the special status of CN. In this case, the Provinces submitted:

The obvious solution is to solely compute CPR's total cost of carrying grain and to use that for both railways. CNR's other costs of carrying grain may well be higher than CPR's, and to use CNR's actual costs only when they are higher than CPR's, and to substitute (for) CNR's costs when the opposite is true, makes no sense.\*

In rebuttal, the Provinces continued this discussion:

Among them (arguments in favor of using CP cost of capital for CN), only one has merit and it does not lead to the recommended conclusion. A reasonable position, and one that probably has support in legislation and practice, is that where a Crown Corporation competes with private enterprise as a consequence of public policy, the Crown Corporation should not enjoy competitive advantages by virtue of its status as a Crown Corporation.... the interest rate at which (a Crown Corporation's) capital was or could have been obtained... is substantially below the cost of capital to an investor-owned utility, and therefore Crown Corporation status conveys a considerable advantage in the area of cost of capital. If an investor-owned and Crown Corporation were identical in

---

\* Exhibit AMS-1, p. 84.

every other respect, there may be circumstances under which it would make sense to calculate capital costs as if the Crown Corporation were investor owned.... The important point to note is that the Crown Corporation is used where the activity is socially desirable and it would not be profitable at the prices which can be charged or the prices that public policy considerations dictate should be charged.\*

In summarizing this point, the Provinces argued:

The use of an opportunity cost rate for CNR capital cost may be justified only in the context of a full opportunity cost approach to the resources employed in CNR. This requires a recognition of social benefits and costs.

No such data has been adduced by CNR during these proceedings to enable this commission to properly allocate the costs attributable to the commercial and non-commercial benefits provided by CNR....

Therefore, even if an opportunity cost approach were considered appropriate in arriving at the CNR grain costs there is no data on this record to implement the approach.\*\*

As further support for their position that "The costs of CP Grain are its costs, and the costs of CN Grain are its costs," the Provinces noted that Canadian National had presented to the MacPherson Royal Commission on Transportation evidence pertaining to the identification of an appropriate

---

\* Exhibit AMS-17, pp. 166 and 167.

\*\* Submission of the Provinces of Alberta, Manitoba and Saskatchewan on Capital Costs, p. 25.

CNR capital structure and recommended cost of funds rate.\*

Quoting from that report, the Provinces note, with approval, the words of Hay concerning the material of Table VII:

This approach amounts to an attempt to place the Canadian National upon a basis similar to that of a corporation which is not owned by the Government. The fact is, however, that the Canadian National is owned by the Government. Whether the money invested in the CNR is raised by the railway directly or indirectly through the Government, the fact is that the money raised is guaranteed by the Dominion of Canada. The cost rate applicable is therefore the cost rate applicable to Dominion of Canada long-term bonds.\*\*

Going back a further 10 years, to the Turgeon Royal Commission on Transportation, the Provinces, quoting from page 188 of that report, noted that the brief presented to that Commission by Canadian National contains the following statement:

In addition, as mentioned elsewhere, the Canadian National operates in the national interest on a basis which cannot be justified commercially, very extensive lines of railway required for strategic, colonization, agricultural and development reasons.

---

\* Ibid., p. 22, refers to Table VII at p. 323 of Volume III of the Royal Commission on Transportation, July 1962; also quoted in cross-examination of Mr. Spicer, at Volume 25, pp. 4862-4864 of the Transcript.

\*\* Ibid.

All emphasis in the submission of the Canadian National Railways is placed on achieving a comparable position with other Class I railroads as regards fixed debt. No account appears to have been taken of the fact that in the case of privately-owned and operated railways equity capital and the cost of servicing it plays a very important part in corporate financing.

Furthermore, on the basis of the above quotation it would appear as if the company recognized that there were very real differences between the aims and objectives of a Government-owned enterprise... and a privately-owned railway which must be operated at a profit if it is to survive.\*

Tying this back to the present, the Provinces argue that as late as June 1975, the Minister of Transport was making similar pronouncements. Referring to Transportation Policy, a Framework for Transport in Canada, Summary Report of the Ministry of Transport, June 1975,\*\* the Provinces referred the Commissioner to the following passage:

Given the importance of transportation to the functioning of Canada, national instruments of policy are essential. Air Canada and Canadian National should continue as public corporations to allow government to ensure the provision of national levels of accessibility, equity, service and price. Government must determine the broad level of service it desires and these corporations must be fully responsive to Government policy decisions in that respect.\*\*\*

---

\* Ibid., p. 23; also quoted at Transcript, Vol. 25, pp. 4868-4870.

\*\* Exhibit SC-8.

\*\*\* Ibid., pp. 26 and 27; quoted at Transcript, Vol. 25, p. 4875.



The Provinces pointed out that, while the Government of Canada has encouraged Canadian National to be commercially oriented, it nonetheless did not require Canadian National to earn a profit and did require Canadian National to adhere to certain constraints imposed by government policy.\* The commercial status of CN and the role of CP as a yardstick railway, the Provinces argued, was subject to a different interpretation:

Statements of policy that Crown Corporations should operate in a manner similar to investor-owned corporations have another interpretation. The goal is efficiency and not profitability. That is, the absence of realized profits and the connection with government should not be used to manage the Corporation without regard for costs. Rather, the operating practices, given the constraints imposed by the public policy objectives, should be comparable to that of private enterprise. It does not follow that the goal of the Government is to enjoy comparable profits. If that were the goal, the Government would be better advised to buy shares in investor-owned corporations.\*\*

Finally, with respect to the arguments in favour of using the opportunity cost of funds to CN, the third and most complicated argument, the Provinces countered:

---

\* Transcript, Vol. 25, p. 4861; Submission of the Provinces of Alberta, Manitoba and Saskatchewan on Capital Costs, p. 24.

\*\* Exhibit AMS-17, p. 168.



we have heard the railway spokesmen throughout these proceedings tell us that 'the costs are the cost.' If this is truly their position there appears to be a glaring exception to their approach to the capital costs of CNR which we are told are CP's capital costs.\*

Essentially, the Provinces argued that opportunity cost must be rejected because:

(it) has not been adopted as the basis for cost determination in the present case. Even if opportunity cost were considered an appropriate basis for cost determination, -- a proposition we clearly do not accept --- it would be most unreasonable to use it for one element of cost, the applicable rate, and use historical cost for the rate base.

...One possible formulation of an opportunity cost determination of the CNR capital costs of carrying grain is to determine the value of the CNR assets so employed in their best alternative use.... The opportunity cost rate for capital is then applied to the opportunity cost rate base, which is likely to include little if anything more than the resale value of the rolling stock and the scrap value of other removable assets.... A second approach ... is to use their (CN Grain assets) cost at the time they were acquired.... Combining the opportunity cost of the railway's assets at the time it was built with the current opportunity cost rate for capital is a strange implementation of the opportunity cost concept.\*\*

Citing that the measurements and implications of either approach were "truly formidable tasks," the Provinces concluded:

---

\* Submission of the Provinces of Alberta, Manitoba and Saskatchewan on Capital Costs, p. 21.

\*\* Exhibit AMS-17, pp. 168 and 169.

There is no more economic rationale for assigning to CNR the CP cost of capital than there is for assigning to CP the CNR operating costs.\*

#### Canadian National Submission

The Summary Statement of the Railways,\*\* though containing references to the CN use of the CP Rail variable roadway investment coefficients, nowhere makes reference to the use of the cost of funds rate of CP Rail for Canadian National. The summary does, however, contain an extended discussion of the differences between CN and CP and warns of the dangers of attempting to combine inputs for both CN and CP Rail or of using CP Rail unit costs for all units of work on CN:

The results of a railway's operations are a composite of thousands of decisions.... Taking one aspect of a decision without the other could produce a meaningless result. ...The result would be a cost applicable to neither railway.\*\*\*

Similarly, the Canadian National initial submission\*\*\*\* contained only simple factual statements concerning the use

---

\* Submission of the Provinces of Alberta, Manitoba and Saskatchewan on Capital Costs, p. 25.

\*\* Exhibit R-1.

\*\*\* Ibid., pp. 39 and 40.

\*\*\*\* Exhibits CN-1 and CN-2.

of a percent rate without reference to the fact that it was identical to the rate utilized by CP Rail.\* Included in this submission was reference\*\* to the submission of Dr. Quirin on behalf of the railways in which:

the method of developing a rate of return to capital (is) fully described.

And, as stated earlier in this Chapter,\*\*\* that submission concluded that the rates at which CN debt "sells" were not representative of the "social cost" of the funds employed by Canadian National.\*\*\*\* However, this was the only reference to the rationale of using CP rates for CN. It was not until the representatives of the railways were themselves cross-examined and were cross-examining the representatives of the Provinces that this matter arose in greater detail.

Though the submission of Mr. Pitblado\*\*\*\*\* did not deal with the cost of common equity that might be appropriate to Canadian National, under cross-examination he did state that:

---

\* Exhibit CN-2, pp. 5, 34, 38, 45, 143, 144, 151, and 157.

\*\* Ibid., p. 11.

\*\*\* Exhibit R-4.

\*\*\*\* Ibid., p. 29.

\*\*\*\*\* Exhibit R-3.

I do not see why the capital that is taken in the form of taxes should go into unproductive -- investments which are not competitive investments. If 20 percent is deemed to be the number that is competitive, then in my judgment I believe that the number should also be attributed to CN equity capital.\*

For the purposes of costing grain transportation by rail before this Commission, the railways utilized the same cost of funds rate for CN as for CP: 24.89%.\*\* In this respect, the railways adopted the approach contained in the Railway Act:

Compute the costs of capital in all cases by using the costs of capital approved by the Commission as proper for the Canadian Pacific Railway Company.\*\*\*

As was brought out during the cross-examination of Mr. Spicer of Canadian National, the intent of this section largely conforms to the circumstance referred to in the initial Provincial submission:

The framers of the legislation felt it important that Canadian Pacific's position as a private company be fully protected and that this would be to

---

\* Transcript, Vol. 9, p. 1729.

\*\* Because of the adjustment to the asset base in CN's cost calculations, to a current value basis, the cost of money computations were based on a rate of return of 23.59 percent (Exhibit CN-2, p. 5).

\*\*\* Railway Act. R.S., c. 234, S.1; Section 276, subsection 3(b).

provide them with an adequate return on their capital and ensure that that was the situation with respect to rates or in compensating the rates for the services that were considered in the national interest.\*

During the cross-examination of Dr. Quirin the topic of the CN cost of capital received considerably more attention.\*\* When questioned on the implications contained in statements cited\*\*\* by the Provincial representatives, after considerable discussion of social benefits, Dr. Quirin reaffirmed his earlier position:

Q. (MR. FORAN) ...I understand in your paper you say that Canadian National's cost of capital should be equated to Canadian Pacific's on a social cost basis?

A. (DR. QUIRIN) Yes, sir, because that is what that money costs Canadians as a whole in foregone output to be obtained by investing the money somewhere else in projects of equivalent risk.\*\*\*\*

In the rebuttal submissions of the railways, the rationale for using the CP Rail cost of funds rate for Canadian National was explored in far greater detail. In particular, Dr. Quirin concluded:

---

\* Transcript, Vol. 25, p. 4905.

\*\* Transcript, Vol. 10, pp. 1919 to 1941.

\*\*\* Including: G.D. Quirin, The Capital Expenditure Decision, Chapter 7; R.A. Musgrave, The Theory of Public Finance, and Professors Eckstein, Arrow, and Lynd.

\*\*\*\* Transcript, Vol. 10, p. 1934.

It is evident, on consideration of the above, that use of CP's cost of capital, if anything, understates the opportunity cost of funds used in CN.\*

Earlier, in referring to the question of whether CN is an instrument of public policy and whether it is to operate on commercial principles, Dr. Quirin noted that the testimony of Mr. J.H. Spicer for Canadian National:

appears to show that both railroads have served as instruments of public policy under the National Transportation Act and other relevant legislation. They continue to do so, and no distinction is made in the legislation.

National Policy and National Transportation Policy, as reflected in legislation and in actions of the Federal Government, fall evenly upon the transport enterprises of both CN and CP Rail and should not have an unequal or differentiating effect on the cost of money of CN and CP Rail.\*\*

Mr. Spicer's testimony\*\*\* traced through the 60-year period 1916-1976 in support of the contention:

It is the position of Canadian National that such a theory (if profits were the objective, Government would invest in private corporations and Government established Crown Corporations for purposes of advancing certain social aspects of Government) is completely unfounded and is not based on fact and does not reflect the intent

---

\* Exhibit R-30, p. 52.

\*\* Exhibit R-30, p. 45.

\*\*\* Exhibit CN-14.



of Government when viewed through its legislation or its other pronouncements and policy decisions.\*

Referring to several passages found in the report of the 1916 Royal Commission into transportation problems in Canada (Drayton-Acworth Report), the railways summarized the conditions and deliberations which led to the establishment of the CNR, directing this Commission's attention to several pertinent recommendations of the Commission, which we have quoted below (page numbers are those of the Drayton-Acworth Report):

We would go further and lay it down in terms in the Act of Parliament creating the Board of Trustees that it was the duty of the Trustees to operate their system as a commercial concern.... We believe that the obligation to work the System as a commercial concern in competition with a well established and well equipped rival will be a stimulus to efficient and economical management. ...They (the Trustees) must have discretion to say how far net profits are imperatively required for railway purposes, and how far they may be safely taken to pay a dividend on the share capital.... (Page LXXII)

We recommend that the Act of Parliament provide that the operation of the company shall be on a commercial basis, and that the Trustees make no general reduction in rates until the property earns a reasonable net return. (Page LXXXIX)\*\*

These were followed by further references to a statement by Prime Minister Sir Robert Borden (May 15, 1918) concerning

---

\* Ibid., p. 11.

\*\* Exhibit CN-14, pp. 13 and 14.

the Government's policy of noninterference in the management of Canadian National, and statements by Sir Thomas White (the Minister responsible) concerning the Government's reasons for instituting corporate management rather than management by a Government Department. These were concluded with the assertion of the CN submission:

Nothing has transpired since which in any way negates that basic and important principle related to the management and operation of the corporation.\*

Reiterating the discussion which took place when Canadian National questioned the Provincial representatives about the Financial Administration Act\*\* where it was pointed out that Canadian National is referenced in Schedule D to that Act and consequently is considered by the Government to be a commercial operation, Canadian National concluded:

That the corporation has been unable to achieve and maintain a profit position does not in any way negate the underlying principle that it is to be profit oriented and to have operations carried on in a commercial way.\*\*\*

Further, Canadian National referred to statements before the Parliamentary Committee (June 10, 1952) by the CNR President,

---

\* Ibid., p. 16.

\*\* Exhibit CN-10.

\*\*\* Exhibit CN-14, p. 17.

Mr. Donald Gordon, and to statements to the 1959, 1960, 1961, and 1964 Sessional Committees of Parliament by Mr. Gordon which served to support their contention that "Canadian National has historically recognized its role and objectives as being commercial in nature."\*

Finally, the CN submission noted that, like the Provincial submission, they found current statements of the Government which supported their contention of CN's commercial status -- albeit the opposite contention from that of the Provinces. Referring to statements by the Prime Minister and Minister of Finance, the Canadian National submission cited, among others, a reference from the Federal Budget of May 25, 1976:

We have been relieved of the necessity of raising about \$300 million, since the Canadian National

---

\* Exhibit CN-14, pp. 19 and 20. Excerpts from these quotes include: "we are subject to the discipline of the market and to the discipline of trying to get a return on our capital (1961)... I have handled the railway, along with the management team and the board of directors, with the legislative instruction to run it as a private enterprise. By private enterprise I mean ... that the profit motive is a proper yardstick, all things considered, and we have to have regard for the dollar and think about the return on investment just as well as anyone else (1961)....The Canadian National Railway is running its business and trying to run it on commercial principle. When there is any expense, which includes the question of taxation, we will employ exactly the same attitude as any private enterprise or corporation (1964)."

Railways and the Export Development Corporation have been authorized as commercial enterprises to exercise their statutory powers to borrow this amount in the capital markets. (emphasis added)\*

From all of the foregoing, CN concluded:

It is therefore the submission of Canadian National before this Commission that it has been and continues to be, at all times, commercially oriented and its objectives are such, and it has been and continues to be the stated policy of the Government of Canada both through its legislation and policy statements made by members of the Government, that it be so managed.

In these circumstances, it is the position of Canadian National that it must be treated as a private corporation as regards a cost of money rate.\*\*

Dr. Quirin, in supporting these points made the statement that:

Dr. Gordon infers public policy with respect to CN's objectives from a scrutiny of its income statements. While one might choose to ignore officially stated policy as expressed in the Financial Administration Act and the Railway Act if there were substantial evidence that these expressions of policy were window-dressing, and that no attempt was being made to carry them out, this cannot, it is submitted, be inferred merely from an examination of income statements....

Our concern here is not, however, with determining the policies of CN but with the determination of its costs of providing certain services. Such costs are not dependent on whether CN is intended

---

\* Exhibit CN-14, p. 24.

\*\* Ibid.

to earn a profit or whether it is intended to sell some or all of its services below cost in order to subsidize railroad users.\*

Following on this, Dr. Quirin undertook a fairly extensive discussion of the appropriateness of using opportunity costs in analyses such as this Inquiry -- situations in which market prices may not be invoked in the exchange of resources between supplier and demander. In this context, Dr. Quirin argued that the incidence of benefits and their measurement were irrelevant to the determination of costs. Agreeing that it was important to evaluate benefits and costs (though categorically rejecting the Provincial suggestion\*\* that it might be appropriate to deduct the value of benefits to society from CN's costs, when using the social opportunity cost of capital) in considering the appropriateness of investment decisions, Dr. Quirin emphasized that opportunity cost or "true social cost" was the proper measure to employ to prevent "serious distortions in industrial structure and inefficiencies in resource allocation."\*\*\*

---

\* Exhibit R-30, pp. 45 and 46.

\*\* Transcript, Vol. 10, p. 1932.

\*\*\* Exhibit R-30, p. 47.



With reference to the books and articles cited by the provinces during their cross-examination of him, in Winnipeg, Dr. Quirin summarized that these only fell onto one of the two sides of the debate which has continued for the past generation. Included in his recognition of those authorities which advocated the use of the rate of interest on government bonds (or a lower rate) as the appropriate cost of funds were those referenced during his earlier cross-examination. These represented several variants of the same general approach:

- the market tends to systematically overvalue present benefits and undervalue future benefits;
- individuals may be willing to accept a lower rate of return if others are similarly forced;
- risk of individual government projects is washed out through diversification of all government projects;
- public sector cost of funds is the interest cost of public debt;
- public debt is not perceived by taxpayers as a liability, and as no burden represents no cost to individuals.\*

---

\* The first stems from A.C. Pigou, Economics of Welfare, W.J. Baumol, Welfare Economics and the Theory of the State is representative of the second group; Arrow-Lynd (the article cited at Transcript, Vol. 10, p. 1924) argued the third; R.A. Musgrave, The Theory of Public Finance referred to the fourth approach; and Dr. Gordon, Journal of Finance (1976), argued for the last variant.



Against these points, Dr. Quirin placed the works of Eckstein and Krutilla who recognized that government projects embodied risks above that reflected by the government bond rate; W.J. Baumol who "abandoned his collective choice theory and proposed the use of opportunity cost" in a later article; R.A. Musgrave, who recognized the debt burden arising from government investments yielding less than effective yields obtainable in the private sector; and, even Arrow-Lynd who imply that since benefits accrue to individuals, not collective units, then individual borrowing rates should form the basis of evaluation\* with the note that "this principle is not advocated solely by economists anxious to limit the growth of the public sector," Dr. Quirin concluded that there have been considerable arguments, retractions, and counter-arguments and, based on his evaluation:

I do not believe there is any meritorious case for rejecting the opportunity cost criterion in public sector decision making or cost computations.\*\*

Finally, after establishing, to his satisfaction, that opportunity cost is the proper measure, and that CP

---

\* The fact that Arrow-Lynd end up on both sides of this debate led Dr. Quirin to remark: "Both conclusions were reached, sir and they are irreconcilable. It is a very unsatisfactory paper in my opinion." Transcript, Vol. 10, p. 1925.

\*\* Exhibit R-30, p. 50.

Rail is the most logical starting point to evaluate available alternatives, Dr. Quirin proceeded to analyze the risk characteristics of Canadian National. Since no market measures of this were available, he examined the stream of operating income before any deductions for interest for CN and CP (including telecommunications operations, because of accounting inseparability) and found that the coefficient of variation (standard deviation/mean) for CN was approximately four times greater (1.01 for CN vs. 0.23 for CP) for the period 1950 through 1974. Based on this single measure, Dr. Quirin concluded that CN was approximately four times as risky as CP, though this difference was partly attributable to different operating ratios (i.e., CP achieved these income levels where expenses were a relatively smaller percentage of revenues; conversely, CN achieved these modest operating income levels on far greater revenue totals).

It was this quantification which led to the earlier quoted passage that CN's cost of funds would likely be understated if the CP cost of funds rate were used.

#### Commission Conclusions

Our findings with regard to the cost of funds rate for Canadian National are summarized at page 100 of the Report, Volume I:

Our objective was to identify the cost of transporting statutory grain by rail. The appropriate cost of funds rate, in this Commission's view, was a rate which fairly and adequately compensated investors for the risks associated with statutory grain transportation. The risks were inherent in the business and were unrelated to the ownership of the enterprise.

Clearly, our view was consistent with that of the railways and United Grain Growers and did not differ from that enunciated by the CTC in the Reasons for Order No. R-6313. We concluded that the proper approach recognized the validity of the opportunity cost rationale and resulted in the proper use of the cost of funds rate of CP Rail for Canadian National.

We have paid some considerable attention to the matter of government policy and the commercial status of Canadian National in reviewing and summarizing the arguments contained in the foregoing pages. However, we must, with due regard for all that has transpired, state that we cannot accept this as a suitable basis on which to discharge our responsibilities under the terms of reference of the Inquiry, with respect to Canadian National. During the cross-examination of Dr. Quirin, the following exchange occurred:

Q. (THE COMMISSIONER) Dr. Quirin, I think you have said that the social benefits accrue solely, as near as you can determine, to the users of the service directly and indirectly?

A. (DR. QUIRIN) Yes, sir.

Q. (THE COMMISSIONER) To the extent, or if the costs of providing the service are greater than the revenues paid for the service and if we adopt Mr. Foran's assumption that the government has essentially acted in a prudent manner throughout, then is not the conclusion that you would reach that the user charge, if you will, for this government-provided service is less than the benefits received and the difference between the cost of the service and what has been returned in rate-making, is a government taxpayer or government benefit provided to the user of the service?

A. (DR. QUIRIN) Thank you, sir, you have said it better than I could. That is my position.\*

We clearly believe that our objective was to measure cost. This Commission was not in a position to incorporate government policy into the cost calculations. We sought to measure the capital funds cost of Canadian National according to the inanimate economic forces of supply and demand in the presence of risk. The source of this measurement was the capital markets in which these forces operated and, within these markets, the most comparable specific measure of capital funds cost that we were able to observe was that of Canadian Pacific Limited. Clearly, we accepted the appropriateness of opportunity cost.

Based on the submissions and testimony before this Commission

---

\* Transcript, Vol. 10, pp. 1931 and 1932.

we adopted the cost of funds rate for CP Rail as the rate to be applied to Canadian National. In this, we rejected the contention of United Grain Growers that to use any other cost of capital for CN than that which we applied to CP Rail was beyond the scope of this Commission.\* The costing procedures laid down by the Railway Act and Cost Order, while forming the springboard for our analyses, were not considered by this Commission to be binding on our costing procedures.

While accepting the rate of CP for CN, we also rejected the contention of Dr. Quirin that the rate for CN might even be higher than that of CP. We were only able to conclude that the best measure of the unobservable capital funds cost for Canadian National was the rate adopted for CP Rail. To the extent that this estimate might differ from some TRUE opportunity cost of funds for CN, we were unable to comment. By extension, we were unable to determine whether such a supposition might lead to a slightly higher or slightly lower rate. However, we have no reason to believe that the estimate provided by using the CP cost of funds rate for CN, as determined by this Inquiry, introduced any error in our computations. Accordingly, the results produced by applying

---

\* Exhibit UGG-2, p. 14 and Transcript, pp. 4903 to 4909.



the weighted cost of funds rate of 20.80 percent to the appropriate net investment values for Canadian National would be the most appropriate measure of the opportunity cost of capital funds employed in the transportation of grain by CN.

Because of the history which accompanied the formation of Canadian National, its subsequent recapitalizations and operating income levels, CN has not paid income taxes in any year except in the early 1950's.\* Accordingly, some have argued that it is inappropriate to include an allowance for an expenditure which does not happen.

For example, speaking on behalf of the Provinces, Dr. Gordon under cross-examination responded:

I would see no reason for an allowance for income tax.... It would be unnecessary because the government would be satisfied to have gotten its interest cost back and the payment of the tax would be immaterial. (Transcript, Vol. 11, p. 2099.)

While cleaving to our observations on the appropriateness of using opportunity costs (20.80 percent), we have allowed that there may be certain cases in which the use of 11.31 percent (the CP rate without allowance for income tax)

---

\* Transcript, Vol. 25, p. 4886: "MR. SPICER: ... In 1952, 1953, 1955 and 1956 and since then, no."



may seem appropriate. We have shown the effects of using this cost of funds rate as an appropriate measure of CN's cost under certain assumptions. As described in Volume I of the Report at pages 102 and 103, the use of this rate arises from the unique position of the government as debtholder, shareholder and tax collector for Canadian National. If CN recovers the cost of 11.31 percent return on net investment involved in grain transportation, then the government, in its role of debtholder and shareholder, will be no better off and no worse off than the debtholders and shareholders of CP Rail. In its role of tax collector, it would clearly be worse off, but:

The fact that the \$11.31 per \$100.00 of investment was all paid as interest to the government and that the government received no monies in its role as the tax collector does not alter the conclusion that the investors in each railway have received the same compensation per \$100.00 of funds invested.\*

For clarification, one point which remains to be explored relative to the use of the 11.31 percent is whether the receipt of the 11.31 percent return on its grain operations would place CN in a position where it was liable for income taxes.

---

\* Report, Volume I, p. 103. Note that this conclusion could be altered in the face of pricing and payment considerations.

By examining the 1974 Annual Report of Canadian National to the CTC, we find that the total revenues were \$1,584.2 million and total operating expenses<sup>\*</sup> were \$1,552.5 million. The resultant net income of \$31.7 million failed to cover the accrued interest obligations for 1974 of \$111.5 million by \$79.8 million. From page 3 of Appendix P of Volume I of the Report, it can be seen that at a capital funds rate of 11.31 percent CN failed to cover its variable costs by \$34.3 million. Thus, even if CN had received revenues to offset this loss, they still would have failed to cover their interest obligations by \$45.5 million and would not have had to pay income taxes. Indeed, even if CN had received revenues equal to their variable costs at a capital funds rate of 20.80 percent, they still would not have been able to meet their total interest obligations.

Finally, we have reported the effect of utilizing the rate of 5.94 percent as the cost of funds rate for Canadian National. We have used this rate to reflect the situation under which CN was expected to recover only its embedded cost of debt. The difference between the costs determined in this fashion and those estimated using 11.31 or 20.80 (depending on the rationale) represents the effect of a government decision,

---

\* Both numbers include express, commercial communications and highway transport operations -- all part of Canadian National Railways.

for whatever reason, to subsidize the transportation of grain by Canadian National by that amount. Quoting from our Report:

In the case of the Canadian National, the owners -- the Federal Government -- choose not to require full risk compensation. Instead they elect to subsidize the railway by offering capital at a rate below that which the enterprise's risk would otherwise require. This choice is largely a policy option, one from which the Government could withdraw if it so desired.\*

---

\* Report, Volume I, pp. 100 and 101.



## CHAPTER X

### COST OF CAPITAL FOR GOVERNMENT INVESTMENT

By an agreement dated September 1973 between the Canadian Wheat Board, Canadian National Railway Company and Canadian Pacific Limited, the Wheat Board undertook to provide to the railways 2,000 covered hopper cars of 4,550 cubic foot capacity equipped with 100 ton trucks. These cars were allocated to the two railways on the basis of the percentage of the total bushels of grain that each carried in the five crop year period from the 1965-66 crop year to the 1970-1971 crop year. Accordingly, CN was to receive 926 cars (46.3%) and CP the other 1,074 cars (53.7%). Throughout 1974, Canadian National had all 926 cars in service, and handled just over 15 grain shipments per car. CP Rail had all 1,074 cars in service for most of 1974 and handled about 16 grain shipments per car.\*

The agreement contained provisions for reallocation of the cars in the event that a significant intramodal shift should occur over any subsequent two-year interval, as well as

---

\* On November 27, 1974, nine of these government hopper cars were totally destroyed in a train accident near Winnipeg. If the number of cars is weighted by the days of the year, the resulting average is  $(331 \times 1,074) + (34 \times 1,065) = 1073.2$  equivalent cars.

emergency allocations of cars, use of cars, demurrage, reporting requirements, and other matters. Of significance, the agreement also contained a provision that ownership of the cars would be retained by the Canadian Wheat Board which would be responsible for license, sales, excise or other taxes and delivery costs to Winnipeg. The operating costs associated with these cars would be the responsibility of railways. The railways were to perform the maintenance and repair of the cars in accordance with the rules of the Canadian Transport Commission and Association of American Railroads and repair these cars at a standard that would not be less than that applied to other similar equipment owned and operated by the railways.

In order to permit computation of car "values" for purposes of reimbursing the Board for cars totally destroyed or for prices to fulfill the railways' options to purchase the cars, the initial purchase prices were taken as \$22,390 and \$22,710 per car for CP and CN respectively.\* Depreciation on the cars is to be calculated on an anticipated service life of 30 years and a salvage value of 9.1 percent of

---

\* The slight variance was due to a minor difference in the configuration of the equipment.



the original cost. This resulted in an annual depreciation allowance of 3.03 percent of the original cost.\*

In computing the costs of transporting grain by rail, all operating costs associated with these cars were included with the freight car costs attributed to the railways. The costs associated with ownership of these cars was shown separately (see Appendix O - Table III of the Report, Volume I), since it was recognized by all parties that these costs were costs to the Government and not costs to the railways.

The Provinces argued:

Depreciation expense and costs of capital on Government-owned hopper cars are not a cost to the railway of transporting grain, and should be excluded.\*\*

Accordingly, the Provincial submissions did not include any estimates for the costs of ownership of these cars.

---

\* This was identical to the CP depreciation rate and salvage value but slightly higher than CN's 2.97 percent for 31 years for all freight cars. This difference was not of significance to our analysis. At 15 years, the two rates yield net book ratios of 45.45 and 44.55 percent respectively.

\*\* Submission on Behalf of the Provinces of Alberta, Manitoba, and Saskatchewan, July 17, 1976, p. 13.

In their initial submissions, the railways included an allowance for depreciation and cost of capital on government-owned hopper cars in their total cost estimates without segregating the individual amounts -- though following references did clarify the amounts included for each component.\* The cost of funds component in these calculations was computed on the basis of the CP Rail rate of 24.89 percent:

Q. (Mr. Foran) In other words, you have included the cost of these cars in your asset base for depreciation and cost of capital purposes?

A. (Mr. Romoff) What we have done is performed a calculation as though these cars belonged to us. The magnitude of cost involved, the ownership was to us ...

Q. (Mr. Foran) Yes. And there is no doubt that these cars are owned by the government of Canada and do not represent capital investment by CP Rail?

A. (Mr. Romoff) No doubt in the world.\*\*

In their rebuttal submissions, these costs were shown separately as "Government of Canada Cost,"\*\*\* though they were still computed "as if owned" by the railways.

In pursuing our mandate, we determined that the definition of costs appropriate for inclusion in our study was

---

\* See Exhibit CN-2, p. 10 and Exhibit CP-4, p. 11.

\*\* Transcript, Vol. 4, pp. 533 and 534.

\*\*\* See Exhibit CN-14, p. 5 and Exhibit CP-38, p. 1-R-1.

costs related directly to transportation of grain by rail but need not be restricted to costs incurred directly by the railways. Accordingly, we viewed the ownership costs of these hopper cars to be costs which would have been borne by the railways in the absence of this government programme and included these in our summary of costs described in Table 8 (and elsewhere) of the Report, Volume I.

These ownership costs were the costs of depreciation and capital funds identifiable with the Wheat Board hopper cars. With respect to the depreciation costs, these were calculated in a straightforward manner as 3.03 percent of the initial gross investment. Note that this cost is independent of whether the cars are one, two, three, or ten years old. The gross investment used for this calculation was:\*

$$(926 \times \$22,710) + (1,074 \times \$22,390) = \$45,076,320$$

and the depreciation charge was  $\$45,076,320 \times .030 = \$1,365,812$ .

---

\* For this calculation, we did not use the weighted average of 1073.2 cars for CP Rail noted earlier. The effect on depreciation cost would have been to decrease that cost by \$543. Similarly, for capital funds costs, the refinement was not included.

With respect to the cost of funds component, there were two issues: the appropriate rate to be applied, and the appropriate base on which to apply it.\* With respect to the latter, the question was whether to use the actual undepreciated book value, each railway's system average freight car net-to-gross ratio applied against the gross investment in the car, or a constructed net book value based on a "mature" asset base. The first of these alternatives would have resulted in a net asset base equal to about 95 percent of the gross investment (about \$43 million). The following year, if the costs were to be recomputed, the net asset base would decline, by the amount of that year's depreciation expense. We chose not to utilize this approach since it would not reflect true long run costs, but would be the result of recent experience only.

The second of the three alternatives was utilized by the railways which applied the system average net-to-gross ratio for all equipment recorded in their property account number 53 -- separately for each railway.\*\* That is, CP applied their net-to-gross ratio of .493 to their allocation of the

---

\* The issue of current value was involved here, also, since the cars were at least one year old, and a few were two accounting years old. We will not address that issue here but refer the reader to Chapter III of this Volume.

\*\* See Transcript, Vol. 4, p. 538.

gross investment to develop a net investment and then used this to develop the capital funds cost. CN likewise applied their freight car net-to-gross ratio, about 58 percent, to their portion of the gross investment (\$21 million). We chose not to utilize this approach since the particular cost should be independent of the two railways and uniform for both. We adopted the third approach and constructed an appropriate net-to-gross ratio which would reflect the position of a mature account (i.e., one in which there were continual retirements and replacements). This was accomplished by deducting one-half of the amount of depreciation that would accrue over a unit's life from the gross investment, based on the annual depreciation rate of 3.03 percent over 30 years:

$$1 - 0.5 (90.9) = 54.55 \text{ or } 0.5 (90.9) + 9.1 = 54.55$$

To develop the net investment base against which to apply the cost of funds rate, we multiplied this net-to-gross ratio against the gross investment:

$$0.5455 \times \$45,076,320 = \$24,589,133$$

The choice of appropriate cost of funds rate reflected the same alternatives described in the previous section:

- embedded cost of funds rate for government funds applicable to the funds used for the purchase of the assets;
- cost of funds rate for CP Rail without allowance for income tax;
- cost of funds rate for CP Rail with allowance for income tax.

Since these cars were purchased in 1973-1974, the embedded interest rate for government funds for that period was set at 8.90 percent, equivalent to the rate on long-term government bonds for 1974. The other two rates, 11.31 percent and 20.80 percent, were those developed earlier for CP Limited.

For the same reasons established in the previous chapter, we chose to utilize the rate of 11.31 percent -- the commercial rate excluding income taxes, as appropriate for determining the capital funds cost incurred by the government. Total costs of ownership of the government hopper cars, therefore, was \$4,146,843; of this amount, \$1,365,812 was the depreciation expense, and \$2,781,031 was the cost of funds component.\*

---

\* Appendix O, Table III clearly shows this development. However, Table P, at Federal Government did not include the depreciation component. Instead of the \$3.4 million reported there (and subsequently), the number should have been \$4.8 million and the total \$235.8 million under "The Commission" column. None of the conclusions of the report are changed. The changes would flow through to the text at pages 205 to 214.



## CHAPTER XI

### GROUP AVERAGE DEPRECIATION AND NET INVESTMENT

Costs which are specific to a type of equipment, group of assets, geographical area, class of traffic or type of train movement are generally more desirable than those derived from broader averages. In the logical extension of this precept, the ideal state would derive from the identification of all costs with specific traffic movements such that no costs were allocated or prorated. Though desirable, this is unattainable. However, the costing process generally should move toward the development of more specific costs rather than less specific costs.\*

The Railway Transport Committee recognized that specific costs were generally desirable and embodied this in its Cost Order:

Whenever specific costs are known or can be readily determined from company records, such costs shall be used in lieu of averaged or allocated costs.\*\*

As noted at page 31 of Volume I of our Report, we adopted the advisability of using specific costs whenever available

---

\* Under certain circumstances the use of less specific costs may be more desirable and, indeed, more accurate than the use of more specific costs.

\*\* Reasons for Order No. R-6313 Concerning Costs Regulations,  
p. 437.

and appropriate and we utilized many of the specific costs developed by the railways and the Provinces.

The use of specific costs arose as an issue in the examination of capital costs because of the relative age of many identifiable assets utilized in the transportation of grain by rail. In the submissions of the railways, this was not an issue because their treatment of the affected assets conformed to the group depreciation procedures approved by the CTC, i.e., they used an accepted accounting practice. The submissions of the Provinces, in contrast, treated the cars used for grain transportation as being distinct from other railway cars and the Prairie branch line network as being distinct from the main line network and other branch lines. The logic for the separations and the impact on expected depreciation and capital costs was that the specific grain-related assets were:

- older than the average assets of the group, and
- in many cases had actually exceeded their expected service lives.

The implication of the first condition was that the net investment base of the particular assets used in grain

transportation would be substantially less, on average, than the net investment base of all assets in the group. Thus, the use of the group net investment base resulted in higher capital funds costs than would be derived on a specific basis. The second condition suggested that the particular assets were fully depreciated. Hence, on a specific basis, there would be a zero depreciation expense allocated to the traffic utilizing these assets and a capital funds cost based on the scrap value of the assets.

#### Group Depreciation Methodology

In order to appreciate fully the nature of this controversy, we will present here a simplified discussion of the principles and implications of group depreciation. Recall that in the normal accounting approach to assets, when costed on an individual basis, the following steps are performed:

1. The initial purchase price of the asset is recorded in the plant account.
2. Each year a portion of that purchase cost is charged against income; i.e., the depreciation expense (the proper amount of depreciation is determined by dividing the depreciable base [i.e., original cost less estimated salvage value] by the number of years of expected service life or by some other process which allocates the depreciable base over the expected service life).

3. The net investment value of the asset is determined by deducting all depreciation of previous years and the current year (i.e., the accumulated depreciation charged against income) from the original asset cost.
4. When an asset is retired from service, the original cost of the asset is deducted from the plant account and the accumulated depreciation account by the amount of the original cost less the net salvage value of the asset (net of recovery and removal costs).\*

Under straightline depreciation the annual depreciation cost of an asset will be uniform over its useful service life. At a constant capital funds rate, the capital funds cost will continuously decline as the remaining undepreciated value of the asset falls (i.e., net asset value). If the asset survives for exactly the number of years included in the depreciable life computation, then the net investment base of the final year will be the final year value and the depreciation cost in the final year will be the same as in other years. If the asset continues to live past that time, however, the depreciation charge will disappear as the asset becomes "fully depreciated." In such cases, the net investment base becomes equal to the estimated salvage value of the asset. The depreciation charge becomes zero and the capital funds cost becomes equal to the capital funds rate times the salvage value.

---

\* The net salvage is also added back to the cash account, but this is unimportant for the purposes of this discussion.

In the accounting sense, this essentially would be a "free" asset.\* It was this relationship between expected service life and actual service life which led the Provinces to exclude the depreciation costs associated with older grain cars and the roadway property on the grain dependent Prairie branch lines.

In actual fact, when an asset is removed from service (either retired or destroyed) the service life and hence the accumulated depreciation on the specific asset will likely have been either greater or lesser than that anticipated when the original cost of the asset was entered in the asset accounts. When net salvage value is greater than the remaining residual book value of the asset at retirement, then the firm will realize a gain on the disposal of the asset. Conversely, when the net salvage value of an asset is less than the book value of the asset, then the firm will realize a loss on the disposal of the asset. In either case, the accumulated depreciation account for that single asset, after retirement, will be zero. In the case of a single asset, any gain or loss on disposal is recorded as other income or expense on the income statement.

---

\* In the economic sense, the opportunity cost of capital of this asset would be equal to the discounted cash flow of the future stream of earnings that would result from the asset.

By contrast, when group depreciation methods are utilized, such gains or losses are never recorded. Under the group depreciation procedure, the initial purchase price is recorded in a plant account, as before, but is grouped with other assets which perform comparable functions or have similar general and life cycle characteristics. The expected service life of every asset in the group is taken as the average of all of the assets in the group. Where these averages differ for specific classes of assets (e.g. hopper cars vs. tank cars) within the group, then the overall group average expected service life is frequently computed as the weighted<sup>\*</sup> average of all of the elements of the group. A depreciation rate is calculated on the basis of the rate derived by dividing the depreciable base (i.e., 100 percent minus the estimated salvage value percentage) by the average expected service life of all assets in the group.

Under the group depreciation method, when an asset is retired, (whether at the average, early, or late life of the group), the retirement is still calculated as if the asset

---

<sup>\*</sup> Weighted by original cost.



had reached the calculated expected service life and the entire original cost of that item (less net realized salvage) is deducted from the accumulated depreciation account. This is true regardless of the amount of depreciation credited to that reserve on behalf of the particular asset. As long as an asset continues to live, even though its life may have exceeded the expected service life of the group, depreciation expense continues to be accumulated until the item is retired. At that time, it is removed from the group as if it were being retired at exactly the group's average expected service life age. Accordingly, group depreciation does not recognize gains or losses on the sale or removal of any one asset within the group. Rather, the size and composition of the group is expected to generate a neutral position, with gains and losses, on average, cancelling each other.\*

Due to the discussion generated by this topic, CP Rail, in their rebuttal submission, included an explanatory table of the process of group depreciation for a single hypothetical group with no additions, followed through to the expiration of the last unit. Since this serves to explain the inner

---

\* For a fuller treatment of this topic, see Public Utility Accounting: Theory and Application, Suelflow, J.E., MSU Public Utilities Studies, Michigan State University, 1973.

workings of the group depreciation system, we have reproduced it here as Schedule XIV. The table is constructed on the following assumptions:

- 1000 freight cars with an original cost of \$20,000 each
- 3.03% depreciation rate for a 30 year expected service life and a 9% salvage value
- retirements arbitrarily constructed to yield 30 year average and assumed to take place at year end.

The depreciation reserve does not reduce to zero at the end because of rounding -- i.e., 91 percent over 30 years yields an actual depreciation rate of 3.0333333. . . . percent. This rounding also accounts for "the anomalous increase in the net-to-gross ratio in the latter years. In actual practice, these minor distortions have no significant effect on the reserve."\*

#### Provincial Analysis

The Provincial submission attempted to utilize specific depreciation and capital costs for substantially grain-related branch lines and grain cars. For the branch

---

\* Exhibit CP-39, p. 8-R-15.

lines, the Provinces used the road property value found in the railway subsidy applications to the C.T.C. which they alleged was, as a practical matter, salvage value. The Provinces quoted, with emphasis, the ruling of the C.T.C. in Order No. R-6313:

that cost of capital be calculated on 'the salvage value... to an amount not exceeding the net book investment, computed on the... group plan' or 'the net book investment... reflecting the specific aging characteristics of the road property.'\*

#### Grain Dependent Lines

In their cost calculations, the Provinces included a cost of funds component resulting from the multiplication of the cost of funds rate times the salvage value of the branch lines.\*\* For both railways, however, the Provinces computed the depreciation for road property of lines substantially related to statutory grain in 1974 as zero, with the accompanying footnote:

1/ Allowable depreciation is limited to decline in salvage value, which is generally zero, and so shown on subsidy applications.\*\*\*

---

\* Ibid., p. 81.

\*\* Exhibit AMS-1, p. N10.7 and Exhibit AMS-2, p. P9.7 both contain this footnote to the entry "Cost of Capital, Road--2/ Cost of capital is allowed on salvage value."

\*\*\* Ibid.

The cross-examination of Provincial witnesses, in Winnipeg, revealed that, for most of the branch lines designated as substantially related to grain, the current salvage value was greater than net book value.\* This led to the conclusion:

The fact that salvage values reflected by the subsidy application were almost always greater than net book value is due primarily to recent increases in salvage prices, not to recent investment in branch-line assets.... The Provinces' realistic treatment of the value of the deteriorated assets on both branch lines contrasts sharply with the higher-inflated road property values developed as a depreciation base by CPR for both branch-line and main-line assets.\*\*

#### Freight Cars

The Provinces found that the box cars principally used for handling grain were older and lower in value than the average for all cars, but that the procedure used for the development of depreciation costs for freight cars made no distinction for differences in age, obsolescence or original cost. From the data shown in Table XL (page 336) the Provinces:

concluded that use of group plan depreciation tends to overstate depreciation cost applicable to cars actually devoted to the grain service, inasmuch as the latter were typically older cars of

---

\* Transcript, Vol. 17, pp. 3420-3425.

\*\* Exhibit AMS-17, pp. 34 and 35.

lower depreciable values. When depreciation is entirely charged out on a car-mile and car-day basis in a common pool with newer, higher-value cars... the unit cost coefficients so derived, in effect, tend to shift depreciation expenses from the newer to the older cars in the fleet.... Also, in contrast to the method of calculating depreciation, the method used here by the Provinces does not continue to charge depreciation on a car after its depreciable life is exceeded. That is, the depreciation base is the weighted average original cost per car, except that the original cost of cars over 31 years old is dropped from the computation.\*

This was the basis of the computations shown in Schedule XV for Canadian National and Schedule XVI for CP Rail. Both of these schedules are reproduced from the Provincial submissions. As noted in the original submissions, these tables also reflect adjustments to the costs of funds applicable to grain-carrying box cars:

to reflect the lower than average investment in such equipment. This adjustment is required to comply with the specificity criterion....\*\*

The Commission disagreed with some of the computational procedures represented by Schedules XV and XVI.\*\*\* Even after correcting for this difference, however, we still could not accept the procedure advocated by the Provinces.

---

\* Ibid.

\*\* Exhibit AMS-2, pp. 70 and 71.

\*\*\* Principally, we felt that weighting by percentage of use should have been based on the number of miles and days and not the number of carloads, since the former reflected the real usage pattern of the fleet.

Table XL  
PROVINCIAL SUMMARY OF  
BOX CAR DATA

	CNR October 1975 Inventory	
	<u>All Boxcars</u>	<u>Cars Carrying 98% Grain Carloads</u>
Number of Cars	45,008	30,122
Age Range (Years)	2-48	18-46
Original Cost Range		
High	\$25,196	\$7,500
Low	2,500	2,508
	CP Rail Freight Cars	
	<u>All Boxcars</u>	<u>Cars Carrying 98% Grain Carloads</u>
Number of Cars	42,163	28,695
Age Range (Years)	0-63	13-45
Original Cost Range		
High	27,496	9,822
Low	930	3,264
Source: Exhibits AMS-1, p. 85 and AMS-2, p. 70.		

The approach adopted by the Provinces for freight cars can be seen through reference to the Group Depreciation Specimen Calculation (Schedule XIV). Under the Provincial approach everything up to year 30 on Schedule XIV would remain unchanged. However, from year 31 onwards, the end of year book value (column 6) would be zero, the depreciation accrual (column 7)



and year end reserve (column 10) would be zero, the year end net book value (column 11) would be zero and the net-to-gross ratio, of necessity, would be zero. Such an approach is clearly asymmetrical. While recognizing that some assets live longer than the average expected service life and taking advantage of the opportunity to derive further service benefit from those units, the approach ignores the fact that some units (in the case of Schedule XIV, 380 of them) were actually retired before attaining the end of the estimated 30 year life. But clearly, these units affected the average expected service life just as the ones that lived beyond their expected limit. To arbitrarily draw a line after the 30th year, is just that -- arbitrary. Though it may appear to conform to the approach of individual assets, it ignores the principles of group depreciation. If all of the box cars were costed specifically, such a procedure would be unnecessary, since the depreciation and capital funds costs would automatically disappear after the age of the car exceeded its expected service life. To impose this effect onto the system of group depreciation is unjustifiable.

## Commission Conclusions

As noted in Volume I of the Report,<sup>\*</sup> we disagree with the approach advocated by the Provinces and others.<sup>\*\*</sup> The appropriate depreciation charge for most assets on the grain dependent branch lines was not zero, and the depreciation charge on older grain box cars, as detailed above, was not zero. With respect to specific asset valuation and group depreciation, we reached the following conclusions:

- some assets on the grain dependent lines were not required for grain transportation or were not used and useful;
- inert assets should be removed from the railway asset accounts;
- assets required for nongrain transportation should be isolated and charged to the appropriate traffic;
- average life expectancy of assets on the grain dependent lines was greater than that of the same assets elsewhere in the railway system;
- the application of the railways' system average depreciation rates to the gross investment on the grain dependent lines overstated the depreciation expense that should properly be charged to these assets;
- because the expired life of many of the assets on grain dependent lines was greater than that represented by the system average net-to-gross ratios, the application of the system

---

<sup>\*</sup> Report, Volume I, p. 115.

<sup>\*\*</sup> Including the National Farmers' Union and the Branch Lines Association of Manitoba; see Transcript, Vol. 4, pp. 655-675.

average net-to-gross ratios to the gross investment in these assets resulted in an overstatement of the net investment and resulting capital funds cost attributed to these lines;

- separate asset groups and depreciation rates should be created for the grain dependent lines;
- given the current state of the group depreciation method used by the railways, the depreciation expense and net asset base attributed to freight cars in the railway costing procedures were appropriate and;
- the creation of more refined asset groups which more closely reflect type and use characteristics would lead to more accurate cost findings.



## SCHEDULES

COMMISSION OF THE COSTS OF TRANSPORTING GRAIN BY RAIL

LIST OF SPONSORS		
Representing	Document	Sponsor (s)
CP Rail	Initial Submission to the Commission (CP -1 to CP-9)	H.M. Romoff, assisted by J.P. Kelsall, F. Wallace, R.O. Martinelli, R.J. Shepp, J. Fox and T. Phillips.
CP Rail	Rebuttal Submission to the Commission (CP-39).	H.M. Romoff, assisted by R.M. Shepp, J. Fox, J.P. Kelsall, F. Wallace, T. Phillips, R.O. Martinelli, and J.P.T. Clough.
Canadian National Railways	Initial Submission to the Commission (CN-1 & CN-2)	R.G. Pringle, assisted by J.A. Maylor, D.G. Wooden, V.H. Alalouf, R.B. Boyd, G. Newlove, A.R. MacDonald, A. Rossi, J.L. Pasemko, A. Stephen and M.E. Kaufman.
Canadian National Railways	Rebuttal Submission to the Commission (CN-14)	R.G. Pringle, assisted by J.H. Spicer, D.G. Wooden, V.H. Alalouf, A. Boggs, R.B. Boyd, M.E. Kaufman, A.R. MacDonald, J.A. Maylor, J.L. Pasemko and F. Steeves.
Northern Alberta Railways	Initial Submission to the Commission (NAR-1)	R.G. Pringle
Provinces of Alberta, Manitoba and Saskatchewan	Initial Submission to the Commission; Volume I-CN (AMS-1) Volume II-CP (AMS-2) and Volume III-NAR (AMS-3).	Robert L. Banks, George H. Borts, George B. Dutton, Jr., Myron J. Gordon, W. Gifford Moore and Thomas M. O'Conner.
Provinces of Alberta, Manitoba and Saskatchewan	Rebuttal Submission to the Commission (AMS-17)	Robert L. Banks, George H. Borts, George B. Dutton, Jr., Myron J. Gordon, W. Gifford Moore and Thomas M. O'Conner.
CP Rail and Canadian National Railways	Summary Statement of the Railways-Initial Submission (R-1)	W.B. Saunders



COMMISSION OF THE COSTS OF TRANSPORTING GRAIN BY RAIL

LIST OF SPONSORS (Continued)

Representing	Document	Sponsor(s)
CP Rail and Canadian National Railways	Memorandum of Constant Costs (R-2).	T.D. Heaver
CP Rail and Canadian National Railways	Memorandum on Cost of Common Equity Capital to Canadian Pacific Ltd. (R-3).	J.B. Pitblado
CP Rail and Canadian National Railways	Memorandum on Capital Costs (R-4).	G. David Quirin
CP Rail and Canadian National Railways	Summary Statement of the Railways: Rebuttal Submission (R-29).	W.B. Saunders
CP Rail and Canadian National Railways	Rebuttal Memorandum on Capital Costs (R-30).	G. David Quirin
National Farmers Union	Initial Submission to the Commission (NFU-1)	Alfred Moore
National Farmers Union	Rebuttal Submission to the Commission (NFU-2)	Alfred Moore
Alberta Wheat Pool, Manitoba Pool Elevators and Saskatchewan Wheat Pool	Initial Submission to the Commission (WP-1)	K.J. Cooksley
Alberta Wheat Pool, Manitoba Pool Elevators and Saskatchewan Wheat Pool	Rebuttal Submission to the Commission (WP-3)	K.J. Cooksley, A.D. McLeod and M.J. Cormack
United Grain Growers	Submission to the Commission (UGG-2)	P. Earl
Palliser Wheat Growers	Submission to the Commission (PWGA-1)	D.E. Campbell
L.G. Benjamin, M.P. Regina - Lake Centre	Submission to the Commission (LGB-1)	L.G. Benjamin

## COMMISSION ON THE COSTS OF TRANSPORTING GRAIN BY RAIL

LIST OF SPOKESMEN	
Spokesman	Representing
R.L. Banks	Provinces of Alberta, Manitoba and Saskatchewan
D.E. Campbell	Palliser Wheat Growers Association
K.J. Cooksley	Alberta Wheat Pool
M.J. Cormack	Manitoba Pool Elevators
D.A. Dever	Canadian Grains Council
J.C. Doak	Manitoba Branch Lines Association
P.D. Earl	United Grain Growers Ltd.
J.E. Foran	Provinces of Alberta, Manitoba and Saskatchewan
W. Hamilton	Canadian Federation of Agriculture
T.C. Kerr	Agriculture Canada
J.K. Knox	CP Rail
A.D. McLeod	Saskatchewan Wheat Pool
A. Moore	National Farmers Union
H.J.G. Pye, Q.C.	Canadian National Railways and Northern Alberta Railways
L.C. Rayner	Canadian Grain Commission
M.E. Rothstein	Provinces of Alberta, Manitoba and Saskatchewan
W.B. Saunders	CP Rail, Canadian National Railways and Northern Alberta Railways
M.C. Tosh	Canadian Transport Commission

LIST OF EXHIBITS  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
AMS-1	<u>Submission</u> by Alberta, Manitoba & Saskatchewan to the Commission on the Costs of Transporting Grain by Rail, Volume 1 - CNR 1974	Robert L. Banks and Associates on behalf of the Provinces of Alberta, Manitoba and Saskatchewan	105 plus Exhibits & Appendices	WPG
AMS-2	<u>Submission</u> by Alberta, Manitoba & Saskatchewan to the Commission on the Costs of Transporting Grain by Rail, Volume II - CP Rail 1974		91 plus Exhibits & Appendices	WPG
AMS-3	<u>Submission</u> by Alberta, Manitoba & Saskatchewan		7 plus Exhibits & Appendix	WPG
AMS-A	Errata - Submission of Alberta, Manitoba and Saskatchewan to the Commission on the Costs of Transporting Grain by Rail; Volume I - CNR, 1974; Volume II - CP Rail, 1974; Volume III - NAR 1974		4	WPG
AMS-1A	Revisions - Submission of Alberta, Manitoba and Saskatchewan to the Commission on the Costs of Transporting Grain by Rail - Volume I - CNR 1974		20	WPG
AMS-2A	Revisions - Submission of Alberta, Manitoba and Saskatchewan to the Commission on the Costs of Transporting Grain by Rail, Volume II - CPR 1974		17	WPG

LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
AMS-3A	Revisions - Submission of Alberta, Manitoba and Saskatchewan to the Commission on the Costs of Transporting Grain by Rail, Volume III - NAR 1974		3	WPG
AMS-4	Quotation from W.B. Saunders' statement to the Royal Commission on Transportation		22	WPG
AMS-5	Capital structure of CP Rail, CP Limited and CP other		1	WPG
AMS-6	Entitled "Canadian Pacific Airlines Limited from balance sheet as at December 31st, 1974"		1	WPG
AMS-7	Entitled "CP Limited dividend earnings, book value and retention growth rate, 1970-1974"		1	WPG
AMS-8	Document entitled "Return on Book for Quintile 5 Companies"		1	WPG
AMS-9	Four columns headed, "company, average price, average book common, price over book"		1	WPG
AMS-10	"Yield of Quintile 1 and 2 Companies"		2	WPG
AMS-11	"Calgary Power Ltd. 1973"		1	WPG

LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
AMS-12	Paper written by Myron J. Gordon October 22, 1975, revised March 25, 1976, entitled "Comparison of Historical Costs in General Price Level Adjusted Costs Rate Base Regulations"		14	WPG
AMS-13	"Consequences of Different Capital Structures for Regulated and Unregulated Subsidiaries"		1	WPG
AMS-14	"Canada Transport Commission, Air Transport Committee, cover sheet and proceeding held on Tuesday, May 14th 1975"		6	WPG
AMS-15	Statement "Comparative Risk Measures for CP Rail, CP Limited and CP Air"		1	WPG
AMS-16	Entitled "Consequences of Relieving CP Limited of its Grain Operations"		3	WPG
AMS-17	<u>Rebuttal Submission to the Commission on the Cost of Transporting Grain by Rail on Behalf of the Provinces of Alberta, Manitoba, and Saskatchewan</u>		205	Regina



LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing submitted
AMS-18	1974 Snapshot Income Statement--CP Rail Statutory Grain Traffic		2	Regina
AMS-19	CP Rail Profit Objective from 1974 Statutory Grain Traffic		1	Regina
AMS-20	Trailer Train Company Annual Report 1975		20	Regina
AMS-21	Form S-7 Registration Statement Under the Securities Act of 1933, Canadian Pacific Limited.		2	Regina
AMS-22	New Issue \$70,000,000 Canadian Pacific Railway Company Collateral Trust Bonds to be dated February 1, 1971.		3	Regina
AMS-23	Responses to Pending Matters and Recommendations on Research on Behalf of Alberta, Manitoba, and Saskatchewan.		11	Regina
AMS-24	Systematic Risk Values and Measures of Return on Common Six Canadian Public Utilities, 1974		1	Orillia
AMS-25	Comparative Capital Structures and Rates of Return for Solvent U.S. Railroads and U.S. Investor owned Electric Utility Companies		1	Orillia



LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
AMS-26	Income after Fixed Charges and Taxes for CP Ltd. and for Certain Companies in which CP Ltd. has an Interest, 1965-1974		1	Orillia
AMS-27	Correct Calculation of CP Return on Capital in 1974 with Grain Traffic Eliminated and Certain Other Adjustments to Accounts		1	Orillia
AMS-28	Mean Absolute Percentage Deviation in Earnings from the Trend Value in Earnings for CP Ltd. and Certain Companies in which CP Ltd. has an interest		1	Orillia
AMS-29	Regression of Market vs. Earnings Beta		1	Orillia
AMS-30	Influence of Negative Earnings on Calculation of Growth Rate in Earnings		1	Orillia
AMS-31	Revised Calculation of Earnings Betas for Companies in Dr. Quirin's Appendix II Sample		1	Orillia
AMS-32	Excerpt from Wallis and Roberts; Statistics: New Approach, The Free Press, Glencoe Illinois, 1956, pp. 139-40.		1	Orillia

LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
AMS-33	Actual, Estimated and Residual Values of Dependent Variable for Cominco		1	Orillia
AMS-34	Freight Traffic in Thousands of Tons Carried by Canadian Railroads, 1950-1969		1	Orillia
AMS-35	Reconciliation of CP Grain with CP Corporate		1	Orillia
AMS-36	Earnings Before Fixed Charges and Income and Income Taxes of Solvent Class I U.S. Railroads (1973)		1	Orillia
AMS-37	Earnings Before Fixed Charges and Income Taxes CP Rail (1974)		1	Orillia
AMS-38	Earnings Before Fixed Charges and Income Taxes CP Rail Assuming the Grain Loss is Covered and Cost of Capital of .1047 is used in 1974		1	Orillia
AMS-39	Earnings Before Fixed Charges & Income Taxes for CP Rail Assuming Grain Loss is Covered as Calculated by CP Rail in Exhibit COP 45		1	Orillia
AMS-40	Summary of AMS Exhibits 36, 37, 38 and 39		1	Orillia

LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
AMS-41	Change in Cost of Equity Capital for the Regulated subsidiary in Appendix V of R-2-R-75 with a Change in Its Capital Structure		1	Orillia
AMS-42	Chapter IX, The Allocation of Joint Costs, From Otto Eckstein, <u>Water Resources Development</u> , Cambridge, 1961.		8	Orillia
BLAM-1	Detailed Statement of Claimed Actual Loss Under Section 258 of the Railway Act for the Lyleton Branch Line (CP) Between Souris and Lyleton (M.O.O - M.37.5) 1973	BLAM Exhibits Introduced by Mr. J.C. Doak, Manitoba Branch Line Association.	2	WPG
BLAM-2	Description of trackage and facilities of that portion of the Lyleton Subdivision between Waskada and Lyleton - Mileage 17.6 - 37.47.		13	WPG
BLAM-3	Canadian comparison of on-line and off-line costs, Canadian National Ltd., 1973		1	WPG
BLAM-4	Canadian comparison of on-line and off-line costs, Canadian National Ltd., 1973		1	WPG
BLAM-5	CP Letter and attachments, re: Applications for leave to abandon part of Lenore Subdivision, CPR		15	WPG

LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
BLAM-6	Letter of June 2, 1976 to J.K. Knox from J.C. Doak and 10-page attachment.	R.G. Pringle on behalf of Canadian National Railways.	13	Regina
BLAM-7	Letter of June 2, 1976 to R.G. Pringle from J.C. Doak and 18-page attachment.		20	Regina
CN-1	Canadian National Railways <u>Submission</u> - Traffic & Revenue		28	
CN-A	Curriculum vitae of various witnesses of Canadian National.		11	WPG
CN-B	Errata statement of Canadian National Railways to the Commission on the cost of transporting grain by rail Appendix to R-1, April 1976.		6	WPG
CN-1-A	Document entitled "Traffic and Revenue - 1974" Table of contents		1	WPG
CN-2	Canadian National Railways <u>Submission</u> Cost Study		178 plus attachments	
CN-2-A	Document (four pages) "Cost Study 1974 - Table of Contents"		4	WPG
CN-2-B	Document entitled "Canadian National Railways, Revised Rehabilitation Costs on Grain lines"		4	WPG

LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
CN-2-C	Document entitled "Canadian National Railways Revisions in On-line Revaluation Factors"		1	WPG
CN-2-D	Document entitled "Canadian National Railways Revised Normalized Maintenance of Solely-Related Grain Lines"		1	WPG
CN-3	Document "Canadian National Railways" re: Subsidy Applications		2	WPG
CN-4	Document regarding speeds in various subdivisions		2	WPG
CN-5	Document entitled "CN Regressions"		2	WPG
CN-6	Document entitled "Provincial Adjustment of CN Regressions to East-West Basis"		1	WPG
CN-7	Document entitled "Provincial Adjustment of Railway Maintenance by Combining CN and CP for West only versus System CN and System CP Rail"		1	WPG
CN-8	Document entitled "Canadian National Railways, Statement of Lease Revenues on substantially grain-related lines"		2	WPG



LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
CN-9	Document "Canadian National Railways Capital Structure as at December 31, 1974"		1	WPG
CN-10	Excerpt from the Financial Administration Act		4	WPG
CN-11	Document entitled "Canadian National Railways - The Selection of Substantially Related Grain Lines"		7	WPG
CN WP-1	Document entitled "Branch Line Rationalization Saskatchewan Area Buildings" (for identification)		29	WPG
CN WP-2	Document entitled "Replacement Cost" (for identification)		2	WPG
CN WP-3	Document entitled "Priority 1" (for identification)		6	WPG
CN-12	Canadian National Rys. Branch-line Rehabilitation Estimate, Solely-Related Grain Lines, Summary, Original Estimates		1	WPG
CN-13	Canadian National Rys., Branch-line Rehabilitation Estimate, Solely-Related Grain Lines, Summary, Revised Estimates		1	WPG



LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
CN-WP4	Comparison of CN/CP Insurance Expenses		1	WPG
CN-WP5	Cost of Cleaning Statutory Grain Box Cars		4	WPG
CN-14	<u>Rebuttal Submission of Canadian National Railways to the Commission on the Cost of Transporting Grain by Rail</u>		111	Regina
CN-14A	Rebuttal Submission of Canadian National Railways to the Commission on the Cost of Transporting Grain by Rail--Corrigenda		1	Regina
CN-14B	Rebuttal Submission of Canadian National Railways to the Commission on the Cost of Transporting Grain by Rail--Corrigenda, June 23, 1976.		1	Regina
CN-15	Canadian National Railways--Cost of Statutory Grain Excluding Ownership Costs of Government Hopper Cars		1	Regina
CN-16	Canadian National Railways--Test of Aluminum Hopper Cars on 177,000 Pound Lines.		1	Regina
CN-17	Miles of Solely Grain Related Lines--Canadian National Railways.		1	Regina

LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
CN-18	Canadian National Railways, Grain Box Car Main Shop Repair Costs.		2	Regina
CN-19	Reference Transcript Volume 22.		2	Regina
CN-20	Canadian National Railways Reference Transcript Pages 4003 and 4004.		8	Regina
CN-21	Canadian National Railways--Reconciliation of BLIP to 1974 Tax Roll		5	Regina
CN-22	Statement--Canadian National Railways Status of Lines Covered in Prohibition Order Number 4.		5	Regina
CPI to CP9 inclusive	Sections of CP <u>submission</u>	Mr. H.M. Romoff on behalf of CP Rail	210	WPG
CP-10	Statement regarding the speeds on solely-related branch lines		2	WPG
CP-11	Document entitled "Lines for which Compensation Claims made in 1974 not included in solely-related to grain category"		2	WPG
CP-12	Document headed CP Rail Solely-Related Branch-lines 1974		3	WPG

LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
CP-13	CP Rail solely-related branchlines 1974 with "branch-lines 1974 prohibition order category" added		3	WPG
CP-14	Statement showing details of taxes paid by CP Rail on the Deloraine, Arcola and Napinka Subdivisions		1	WPG
CP-15	Document entitled "CP Rail Regressions"		2	WPG
CP-16	Statement entitled "Provincial Adjustment of CP Rail Regressions to East-West Basis"		1	WPG
CP-17	Annual Report of CP Limited 1975		22	WPG
CP-18	Document showing makeup of Canadian Pacific Limited and Canadian Pacific Investments Limited		2	WPG
CP-19	Statement "CP Rail, CP Rail Car Days from the sample of Direct Shipments"		1	WPG
CP-20	Document entitled "Example of a CP Rail Shipment accepted because the first loaded move was within 25 miles from waybill order origins and on the same subdivision"		1	WPG

LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
CP-21	Document entitled "Example of CP Rail shipment accepted because it was the first station from a junction point and within 25 miles of the junction point"		1	WPG
CP-22	Document entitled "CP Rail Solely-Related Branchlines 1974"		4	WPG
CP-23	Document "Canadian Pacific Limited Capital Structure for Canadian Pacific Limited - Corporate at December 31, 1974"		1	WPG
CP-24	Document entitled "Canadian Pacific Limited - Consolidated at December 13, 1974"		1	WPG
CP-24A	Two-Page Document-- Capital Structure for Canadian Pacific Limited --Consolidated At December 31, 1974, and Explanatory Covering Page--CP24 Revised.			
CP-25	Statement "Average train size in gross ton Prairie and Pacific regions"		1	WPG
CP-26	Document entitled "Return on net book investment for CP Rail"		1	WPG
CP-27	Document entitled "Return on net book investment Canadian Pacific Limited Corporate"		1	WPG

LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
CP-27A	Two-page Document-- Canadian Pacific Limited Return on Net Book Investment for Canadian Pacific Limited --Corporate at December 31, 1974, and explana- tory Covering Page-- CP27 Revised		2	Winnipeg
CP-28	Document entitled "Return on net book investment Canadian Pacific Limited Consoli- dated" Amended CP-28		1	WPG
CP-A	Errata sheet referring to CP-1, CP-2, CP-3, CP-8		1	WPG
CP-B	Curriculum vitae for various witnesses of Canadian Pacific		5	WPG
CP-29	Document entitled "CP Rail-Switching Analysis, Grain Traffic Study"		1	WPG
CP-30	Document entitled, "Comparative Statement- Yard Switching Minutes per Car Mile, Grain Study Traffic Versus All Other Traffic, Prairie and Pacific Regions 1974"		1	WPG
CP-30B	Errata Exhibit R-30		1	Orillia
CP-31	Document entitled "Development of Statu- tory Grain Car Days"		4	WPG
CP-32	Document entitled "CP RAIL - Net Investment Ratio"		1	WPG



LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
CP-33	Document entitled "CP RAIL - Memorandum on At and East Grain"		13	WPG
CP-34	Document entitled "CP RAIL - Switching Times at Edmonton for N.A.R. Originating Traffic"		1	WPG
CP-35	Document entitled "CP RAIL - Branchlines Identified by CP Rail as Solely Related, CP - 4, Schedule 2, and also Identified by the Provinces as Substantially Related, AMS 6.1, Volume II."		2	WPG
CP-36	Document entitled "CP RAIL - Branchlines Partially Identified by CP RAIL as Solely Related, CP-4, Schedule 2. But Fully Identified by the Provinces as Substantially Related, AMS 6.1, Volume II".		1	WPG
CP-37	Document entitled, "CP RAIL - Branchlines Identified by the Provinces as Substantially Related, AMS P.6.1, Volumes II but not Identified by CP RAIL as Solely Related."		1	WPG



LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
CP-38	Document entitled "CP RAIL - Branchlines Identified by CP RAIL as Solely Related, CP-4 Schedule 2, but <u>not</u> Identified by the Provinces as Substantially Related."		2	WPG
CP-39	<u>CP Rail Rebuttal Submission</u> to the Commission on the Costs of Transporting Grain by Rail.	Mr. H.M. Romoff, on behalf of CP Rail	130	Regina
CP-39A	Errata--CP Rail Rebuttal Submission		1	Regina
CP-40	CP Rail Results of Through Traffic Cut Size Analysis for Classification (1)		1	Regina
CP-41	Response to Request from the Commission--significance of Volume Difference Between 1973 and 1974		3	Regina
CP-42	Capital Employed in Grain by CP Rail--Year 1974		1	Regina
CP-43	CP Rail Property Taxes		1	Regina
CP-44	CP Rail Uncompensated Passenger Losses--1974--		1	Regina
CP-45	CP Rail--1974 Rate of Return		2	Regina

LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
CP-46	CP Rail--Solely Related Branchlines--1974--showing percent Statutory Grain of Originating and Terminating Traffic Based on Carloads		3	Regina
CP-47	Document--CP Rail--1974 Analysis of Contribution		6	Regina
CP-WP-44-45-47	One-Page Document--CP Rail--Workpaper for CP 44-45 and 47.		1	Regina
CP-48	CP Rail--Cut Size Analysis--Yard Switching Operations		1	Regina
CP-49	CP Rail--Development of Unit Switching Times Main Classification Operations		1	Regina
CP-50	CP Ltd.--Statutory Debt Limit--December 31, 1974.		1	Orillia
LGB-1	Submission of L. G. Benjamin, M.P.	L. G. Benjamin, M.P.	5	Winnipeg
NAR-1	Twenty-five page Submission Northern Alberta Railways Appendix to R-1	Mr. R.G. Pringle on behalf of the Northern Alberta Railways.	25	Winnipeg
NAR-1-A	Document entitled "Table of Contents" one page		1	Winnipeg
NFU-1	Thirty-six page document Submission to the Commission on the Costs of Transporting Grain by Rail	Mr. A. Moore on behalf of the National Farmers Union	36	Winnipeg

LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
NFU-1-A	Errata sheet of National Farmers Union		1	Winnipeg
NFU-2	Rebuttal Submission to the Comm. on the Costs of Transporting Grain by Rail, Regina, Saskatchewan, June 21, 1976, presented by Alfred Moore--28 pages.	Mr. Moore on behalf of the National Farmers Union.	28	Regina
PWGA-1	Fifty-one page document-- <u>Submission</u> to the Commission on the Costs of Transporting Grain by Rail	Mr. D. E. Campbell on behalf of the Palliser Wheat Growers Association	51	Regina
R-1	Exhibit of Mr. W.B. Saunders	Mr. W.B. Saunders on behalf of the Canadian National Railways and CP Rail	34	Winnipeg
R-1-A	Summary Statement by W.B. Saunders on Behalf of Canadian National and CP Rail		7	Winnipeg
R-1-B	Errata sheet to Mr. Saunders' statement filed Monday, April 19.		1	Winnipeg
R-1-C	Page R-1-20 of Mr. Saunders' Exhibit R-1		1	Winnipeg
R-1-D	Addendum to R-1, Comparison of U.S. and Canadian Rates on Grain		1	Winnipeg
R-1-E	Supplemental information requested by the Commission re page R-1-64 of R-1		1	Winnipeg

LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
R-1-F	Quotations from report of MacPherson Royal Commission		2	winnipeg
R-2	Exhibit of Dr. T.D. Heaver	Dr. T.D. Heaver on behalf of Canadian National Railways & CP Rail	18	Winnipeg
R-2-A	Errata sheet to Dr. Heaver's statement filed Tuesday, April 20.		1	Winnipeg
R-2-B	Errata sheet to line 8 in the second paragraph of Dr. Heaver's statement		1	Winnipeg
R-2-C	Quotation from article headed "Criteria of a Desirable Rate Structure"		1	winnipeg
R-3	Submission of Mr. J.B. Pitblado	Mr. J.B. Pitblado on behalf of CN Railways & CP Rail.	28	Winnipeg
R-4	Submission of Dr. G.D. Quirin	Dr. G.D. Quirin on behalf of CN Railways & CP Rail.	91	Winnipeg
R-5	Document, Canadian National - CP Rail, 1974, "Density of Traffic by Subdivision" based on G.T.M./mile summary		1	Winnipeg
R-6	Document, "Canadian National-CP Rail Residual Plot of the Account 202 CX Regression as computed by the Provinces at page 61 of AMS Volume I and pages 45 and 46 of AMS Volume II		1	Winnipeg

LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
R-7	Document entitled "Summary of risk measure values quintiles 1 and 5"		1	Winnipeg
R-9	SEC statement referring to the Securities Act of 1933, the Securities Exchange Act of 1934, the Public Utilities Holding Company Act of 1935 and Accounting Services March 23, 1976		35	Winnipeg
R-10	Statement entitled "Times Charges Earned, U.S. Railroads with revenues of \$100 million and over in 1974, Classified by Moody's ratings"		1	Winnipeg
R-11	One-page document "Interest and Fixed Charges Coverages under AMS Cost - 1974"		1	Winnipeg
R-12	One-page statement entitled "Coverages Under AMS costs - at 1969 Volumes"		1	Winnipeg
R-13	One-page document entitled "Fixed Charges Coverages with AMS-1974"		1	Winnipeg
R-14	Copy of article from "Journal of Finance", Vol. 28, No. 1 of March 1973, by M.E. Blume and I. Friend		9	Winnipeg



LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
R-15	Document entitled "1974 Annual Report on Utility and Carrier Regulation, National Association of Regulatory Activity Commissioners"		10	Winnipeg
R-16	Article "Rates of Return in Relation to Risk", etc., from "Studies in the Theory of Capital Markets" edited by Michael C. Jensen		16	Winnipeg
R-17	Article entitled "Cost of Capital for a Division of a Firm" By Myron J. Gordon and Paul J. Halpern in the Journal of Finance, September, 1974		6	Winnipeg
R-18	One-page document entitled Ratio of Earnings Beta to Security Betas for companies in AMS-P7.1 and AMS-P7-2		1	Winnipeg
R-19	One-page document entitled "Relationship Between Earnings Betas (AMS-P7.2) and security Betas (AMS-P7.1)"		1	Winnipeg
R-20	One-page document entitled "Relationship between Earnings Betas and Security Betas after Adjusting two Earnings Betas by one Standard Error"		1	Winnipeg



LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
R-21	Article entitled "On the Assessment of Risk" by Marshall E. Blume from the "Journal of Finance", March 1971			winnipeg
R-22	One-page document, "Earnings Beta for Cominco Ltd. based on all Observations (1950-1974)"		1	Winnipeg
R-23	One-page document, "Earnings Beta for Great Lakes Paper Co. Ltd. with 1973 Observation Excluded".		1	winnipeg
R-24	One-page document, "Earnings Beta for Great Lakes Paper Co. Ltd. based on all Observations (1950-1974)"		1	Winnipeg
R-25	One-page document, Earnings Beta for Great Lakes Paper Co. Ltd. based on Observations for Selected Periods"		1	Winnipeg
R-26	Document entitled "Percentage Change in Earnings"		1	winnipeg
R-27	Exposure Draft entitled "Accounting for Changes in the General Purchasing Power of Money - Canadian Institute of Chartered Accountants, December 31, 1975."		39	Winnipeg

LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
R-28	Exposure Draft entitled, "Financial Reporting in Units of General Purchasing Power" - Financial Accounting Standards Board - Dec. 31, 1974		99	winnipeg
R-29	Rebuttal Submission to the Commission on the Costs of Transporting Grain by Rail by William B. Saunders on behalf of Canadian National and CP Rail-- 34 pages.	Mr. W. B. Saunders on behalf of CN Railways and CP Rail.	34	Regina
R-29A	Errata for R-1-R; 3 pages.		3	Regina
R-30A	Regression Results Earnings Betas on Physical Betas (expanded sample) --2 pages.		2	Regina
R-30	Rebuttal Submission to the Commission on the Costs of Transporting Grain by Rail by G. David Quirin on behalf of Canadian Pacific Limited and Canadian National--85 pages.	Dr. G. D. Quirin on behalf of CN Railways and CP Rail	52	Regina
R-30B	Errata--Exhibit R-30-- one page.		1	Regina
R-31	Farm cash receipts 1974 --Statistics Canada catalogue 21-201 Annual.		29	Regina
R-32	Farm net income 1974-- Statistics Canada catalogue 21-203 Annual.		37	Regina

LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
R-33	Illustration of Methods Underlying Witness Cooksley's Exhibit WP-4, Table B-2 pages.		2	Regina
R-34	3-page Statement from Canada Grains Council includes excerpts from Chapter V, pages 87 and 88.		3	Regina
R-35	Response to Commission Request Analysis of Cost Differences Between CN and CP Rail--W.B. Saunders--12 pages.		12	Regina
R-36	Statutory Grain Rates Mileage Coverage for Each Level of Rates--To Thunder Bay.		1	Regina
R-37	Statutory Grain Rates Mileage Coverage for Each level of Rates--To Vancouver.		1	Regina
R-38	Confidence Limits--Electric Utility Capital Structure -- one page.		1	Regina
R-39	Debt Ratios vs. EBIT Rate of Return by Rate of Return Groups--one page.		1	Regina
R-40	Debt Ratios vs. EBIT Return on Total Capital --one page diagram.		1	Regina
R-41	One-page--Capital Structure at Market Value, 1974 Canadian Pacific Ltd. (Consolidated)		1	Regina

LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
R-42	One-page--Rates of Return on Total Assets--Before Taxes--1974--Non-utility Companies in Quintile 1.		1	Regina
R-43	One-page--Canadian Securities and Bill-Yields and Earnings Ratios.		1	Regina
R-44	3-page document, pages 557-559 of transcript of May 21/74 Hearing before Alberta Public Utilities		3	Regina
R-45	One-page document--Systematic Risk Values and Allowed Rates of Return on Common Equity, Six Canadian Public Utilities.		1	Regina
R-46	Estimates of Investor's Required Rates of Return for Major Subsidiaries of CPI--one page		1	Orillia
R-47	Earnings Per Share, 1964-1974, of Major Subsidiaries of CPI--one page.		1	Orillia
R-48	Expected Rates of Growth for the Four Major Subsidiaries of CPI, Using the "BR" Method with Historical Mean Values of "B" and with "R"--one page.		1	Orillia

LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
R-49	Expected Rates of Growth for the Four Major Subsidiaries of CPI Using the "BR" Method with Historical Mean Values of "B" and with "R" equal to 15%		1	Orillia
R-50	Estimates of Common Equity Investors' Required Rates of Return for the Four Major Subsidiaries of CPI, Using the "BR" Method with Historical Mean Values of "B" and with "R" Equal to 15%.		1	Orillia
R-51	Estimated Growth Rates--EPS; Canadian Pacific Ltd. Based on Exponential Smoothing Model -- one page.		1	Orillia
R-52	Graphical Presentation of Data from AMS-25--one page.		1	Orillia
R-53	Relationship between two variables based on two samples -- one page.		1	Orillia
R-54	Relationship between two variables based on two samples--Sample B--one page.		1	Orillia
R-55	Relationship between two variables based on two samples Example C--one page.		1	Orillia



LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
R-56	CP Rail Annual Tonnage Figures--one page.		1	Orillia
R-57	Estimating Equation for CP tonnage--one page.		1	Orillia
R-58	Tonnages Carried-- Certain Primarily Ore-Carrying Railroads--one page.		1	Orillia
R-59	Evidence on the Information Content of Accounting Numbers: Accounting-Based and Market-Based Estimates of Systematic Risk by Nicholas J. Gonedes 37 pages.		37	Orillia
R-60	Competition, Economic Efficiency and Profitability in the Canadian Property and Casualty Insurance Industry--593 pages.		593	Orillia
R-61	Depreciation, etc. -- Example 1--Stable Prices--one page.		1	Orillia
R-62	Depreciation, etc. -- Example 2--Rising Prices--one page.		1	Orillia
R-63	Depreciation, etc. -- Example 3--Increase in Prices--Current Value Accounting--one page.		1	Orillia
SC-1	Document entitled "CN statement showing 1974 carloads originated and terminated by region, division and subdivision"	"SC" Exhibits presented to all parties by the Commission	5	Winnipeg



LIST OF EXHIBITS (Continued)  
Commission of the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
SC -2	Document entitled "CN statement showing 1974 tons originated and terminated by region, division and subdivision"		5	Winnipeg
SC-3	Document entitled "CN statement showing 1974 revenues originated and terminated by region, division and subdivision"		5	Winnipeg
SC-4	Statement entitled "CP statement showing 1974 carloads originated and terminated by region, division and subdivision"		5	Winnipeg
SC-5	Statement entitled "CP statement showing 1974 tons originated and terminated by region, division and subdivision"		5	winnipeg
SC-6	Statement entitled "CP statement showing 1974 revenue originated and terminated by region, division and subdivision"		5	Winnipeg
SC-7	Loram International Report on Maintenance and Rehabilitation Cost on Selected Prairie Branch Lines. (CONFIDENTIAL)		-	Regina
SC-8	Document entitled "Transportation Policy, a Framework for Transportation in Canada, Summary Report of the Ministry of Transport, June 1975"		44	Regina

LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
SC-9	Document entitled "An Interim Report on Inter-City Passenger Movement in Canada, Ministry of Transport, June 1975"		150	Regina
SC-10	Document entitled "An Interim Report on Freight Transportation in Canada, Ministry of Transport, 1975"		53	Regina
SC-WP-1	Document entitled "Use of Canadian Pacific as a Yardstick in Computing Cost of Capital"		11	Regina
SC-11	Report on the Status of Passenger Train Constant Cost Calculations for Year 1974 for purposes of Subsidy: that is Section 261 of the Railway Act.		3	Orillia
WP-1	<u>Submission of Alberta, Wheat Pool Manitoba Pool Elevators and Saskatchewan Wheat Pool.</u>	Mr. K. Cooksley on behalf of Alberta Wheat Pool, Manitoba Pool Elevators and Saskatchewan Wheat Pool.	14	Winnipeg
WP-1-A	Errata to WP-1		1	Winnipeg
WP-2	Excerpt from the Book "Grain and Oilseeds, Handling, Marketing and Processing"		2	Winnipeg
WP-3	<u>Rebuttal Submission of the Alberta Wheat Pool, Manitoba Pool Elevators and Saskatchewan Wheat Pool.</u>	Mr. K. Cooksley and A. McLeod on behalf of the Pools	34	Regina

LIST OF EXHIBITS (Continued)  
Commission on the Costs of Transporting Grain by Rail

Exhibit Number	Title and Description	Author	Number of Pages	Hearing Submitted
WP-3-A	Revision to Page 7 WP-3		1	Regina
WP-4	Table A - Revision of Table 1 to include value of grain fed or disposed of locally by producers		4	Regina
WP-5	Formula from Western Grain Stabilization Committee - 1968 Working Paper		1	Regina
UGG-1	Document entitled "Debt-Equity allocation procedure seemingly Implicit in AMS-2"		2	Winnipeg
UGG-WP-1	Question for Drs. Quirin and Gordon		5	Winnipeg
UGG-2-A	Qualification of Mr. Berry	Mr. P. Earl on behalf of United Grain Growers	1	Regina
UGG-2	Rebuttal Submission of the United Grain Growers		48	Regina

CP RAIL  
CAPITAL FUNDS COST METHODOLOGY

Property a/c No.	Group Description	Method of Analysis (number of years of data used)	Service Units	Capital Funds Rate Applied to:
2	Land	Direct Assignment (1 year)	Specific Cost	Lesser of net book investment and net salvage
2 1/2-47 excl. 21, 22, 23, 26 (Comm.), 40, 43, & 47	Road Property (On-Line)	Direct Assignment (1 year)	Specific Cost	Lesser of net book and net salvage
2 1/2, 3, 8, 9, 10, 11, 12, 17 37, 38, & 39	Track and Roadway	Multiple Regression (5 years)	1) GTM 2) Y & TSM 3) Road Miles 4) Gradient index	Variable gross investment times net-to-gross ratio
16 & 16 1/2	Station and Office	Simple Regression (3 years)	Total expense in a/c 373 & 376	Variable gross investment times net-to-gross
18 & 19	Water and Fuel Stations	Simple Regression (3 years)	Gallons diesel fuel pumped	Variable gross investment per gallon times fuel cost per gallon times net-to-gross

CP RAIL  
CAPITAL FUNDS COST METHODOLOGY

Property a/c No.	Group Description	Method of Analysis (number of years of data used)	Service Units	Capital Funds Rate Applied to:
20	Shops and Enginehouses	Simple Regression (3 years)	Total expenses in a/c 311A + 314 + 317 + 323 + 326 + 328	Variable gross investment times net-to-gross
26	Communications - Rail	Direct Analysis (1 year)	Total system variable ex- penses in a/c 201-446*	70% of net invest- ment divided by service unit
27	Signals	Multiple Regression (3 years)	1) Train hrs. 2) Y & TSM	Variable gross investment times net-to gross
29 & 31	Power Plant Systems	Simple Regression (3 years)	Total expenses in a/c 311A + 314 + 317 + 323 + 326 + 328 + 373 + 376	Variable gross investment times net-to-gross
52	Diesel Loco- motives	Direct Analysis (1 mile)	Diesel unit miles	Variable gross investment times net-to-gross



CP RAIL  
CAPITAL FUNDS COST METHODOLOGY

Property a/c No.	Group Description	Method of Analysis (number of years of data used)	Service Units	Capital Funds Rate Applied to:
53	Freight Train Cars	Direct Analysis (miles - 3 years) (days - 1 year)	1) Car-miles (20%) 2) Car-days (80%)	Variable gross investment times net-to-gross
57	Work Equipment	Direct Analysis (3 years)	Total expen- ses in a/c 202 + 208 + 212 + 214 + 216 + 218 + 229 + 269 + 271 + 272 + 273 + 281	Variable gross investment times
58	Other Equipment	Direct Assignment (as specified)	Specific cost	Variable gross investment times net-to-gross
59	Shop Machinery	Simple Regression (3 years)	Total expen- ses in a/c 311A + 314 + 317 + 323 + 326 + 328	Variable gross investment times net-to-gross



CP RAIL  
CAPITAL FUNDS COST METHODOLOGY

Property a/c No.	Group Description	Method of Analysis (number of years of data used)	Service Units	Capital Funds Rate Applied to:
60	Power Plant Machinery	Simple Regression (3 years)	Total expenses in a/c 311A + 314 + 317 + 323 + 326 + 328 373 + 376	Variable gross investment times net-to-gross

Note: Excluded from this table are: wharves, passenger train cars, vessels.

























\*Excluding a/c 351 - 359  
247, 407 - Traffic  
266, 305, 331 - Rail Communications  
275, 333, 414 - Depreciation  
278, 279, 336 - Insurance  
337, 390, 391  
412, 413 - Joint Facilities

Source: Costing Manual, Canadian Pacific Limited.

**Uniform Assumptions for All Examples**

























- four shovels, initially 3,2,1,0 years old at beginning of year
- expected service life when new of 4 years, no salvage at end
- depreciation on straight-line base
- depreciation taken and shovel purchased at Dec. 31/Jan. 1 of each year

**Example A. STABLE PRICES—HISTORIC COST VALUES** - Assumption: new shovels cost \$10.00 each; depreciation on historical cost;  
rental = depreciation charges plus 8% on net historical investment

	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6	
	Jan.1 Value	Dec.31 Dep'n	Jan.1 Value	Dec.31 Dep'n	Jan.1 Value	Dec.31 Dep'n	Jan.1 Value	Dec.31 Dep'n	Jan.1 Value	Dec.31 Dep'n	Jan.1 Value	Dec.31 Dep'n
Shovel 1	 10.00 2.50		 7.50 2.50		 5.00 2.50		 2.50 2.50		 10.00 2.50		 7.50 2.50	
Shovel 2	 7.50 2.50		 5.00 2.50		 2.50 2.50		 10.00 2.50		 7.50 2.50		 5.00 2.50	
Shovel 3	 5.00 2.50		 2.50 2.50		 10.00 2.50		 7.50 2.50		 5.00 2.50		 2.50 2.50	
Shovel 4	 2.50 2.50		 10.00 2.50		 7.50 2.50		 5.00 2.50		 2.50 2.50		 10.00 2.50	
Valuation Base	25.00		25.00		25.00		25.00		25.00		25.00	
Depreciation Funds		10.00		10.00		10.00		10.00		10.00		10.00
Available for Reinvestment			10.00		10.00		10.00		10.00		10.00	
Shovel Purchases			10.00		10.00		10.00		10.00		10.00	
Depreciation Shortfall			0.00		0.00		0.00		0.00		0.00	
8% Return	2.00		2.00		2.00		2.00		2.00		2.00	
Year End Values of Invest.	25.00		25.00		25.00		25.00		25.00		25.00	
Investor Funds	27.00		27.00		27.00		27.00		27.00		27.00	
Investor Funds at Jan. 1	25.00		25.00		25.00		25.00		25.00		25.00	
Net Investment			0.00		0.00		0.00		0.00		0.00	
Existing Investment			25.00		25.00		25.00		25.00		25.00	

Source: Exhibit R-6

**Example B. RISING PRICES—HISTORICAL COST VALUES** - Assumption: prices increase 10% on Dec. 31/Year 1, then remain at new level

























	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6	
	Jan.1 Value	Dec.31 Dep'n	Jan.1 Value	Dec.31 Dep'n	Jan.1 Value	Dec.31 Dep'n	Jan.1 Value	Dec.31 Dep'n	Jan.1 Value	Dec.31 Dep'n	Jan.1 Value	Dec.31 Dep'n
Shovel 1	 10.00 2.50		 7.50 2.50		 5.00 2.50		 2.50 2.50		 11.00 2.75		 8.25 2.75	
Shovel 2	 7.50 2.50		 5.00 2.50		 2.50 2.50		 11.00 2.75		 8.25 2.75		 5.50 2.75	
Shovel 3	 5.00 2.50		 2.50 2.50		 11.00 2.75		 8.25 2.75		 5.50 2.75		 2.75 2.75	
Shovel 4	 2.50 2.50		 11.00 2.75		 8.25 2.75		 5.50 2.75		 2.75 2.75		 11.00 2.75	
Valuation Base	25.00		26.00		26.75		27.25		27.50		27.50	
Depreciation Funds		10.00		10.25		10.50		10.75		11.00		11.00
Available for Reinvestment			10.00		10.25		10.50		10.75		11.00	
Shovel Purchases			11.00		11.00		11.00		11.00		11.00	
Depreciation Shortfall			1.00		0.75		0.50		0.25		0.00	
8% Return	2.00		2.08		2.14		2.18		2.20		2.20	
Year-End Values of Invest.	25.00		26.00		26.75		27.25		27.50		27.50	
Investor Funds	27.00		28.08		28.89		29.43		29.70		29.50	
Invest. Funds at Jan. 1	25.00		23.64		26.75		27.25		27.50		27.50	
Jan. 1												
New Investment			1.00		0.75		0.50		0.25		0.00	
Existing Investment			22.64		26.00		26.75		27.25		27.50	

Source: Exhibit R-62 and R-4, page 22

Uniform Assumptions for All Examples

























- four shovels, initially 3,2,1,0 years old at beginning of year
- expected service life when new of 4 years, no salvage at end
- depreciation on straight-line base
- depreciation taken and shovel purchased at Dec. 31/Jan.1 of each year

Example C. RISING PRICES—CURRENT COST VALUES - Assumption: prices increase 10% on Dec. 31/Year 1, then remain at new level

	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6	
	Jan.1 Value	Dec.31 Dep'n	Jan.1 Value	Dec.31 Dep'n	Jan.1 Value	Dec.31 Dep'n	Jan.1 Value	Dec.31 Dep'n	Jan.1 Value	Dec.31 Dep'n	Jan.1 Value	Dec.31 Dep'n
Shovel 1	 10.00	2.75	 8.25	2.75	 5.50	2.75	 2.75	2.75	 11.00	2.75	 8.25	2.75
Shovel 2	 7.50	2.75	 5.50	2.75	 2.75	2.75	 11.00	2.75	 8.25	2.75	 5.50	2.75
Shovel 3	 5.00	2.75	 2.75	2.75	 11.00	2.75	 8.25	2.75	 5.50	2.75	 2.75	2.75
Shovel 4	 2.50	2.75	 11.00	2.75	 8.25	2.75	 5.50	2.75	 2.75	2.75	 11.00	2.75
Valuation Base	25.00		27.50		27.50		27.50		27.50		27.50	
Depreciation Funds Available for Reinvestment	11.00		11.00		11.00		11.00		11.00		11.00	
Shovel Purchases			11.00		11.00		11.00		11.00		11.00	
Depreciation Shortfall			0.00		0.00		0.00		0.00		0.00	
8% Return	2.00		2.20		2.20		2.20		2.20		2.20	
Year-End Value of Invest.	25.00		27.50		27.50		27.50		27.50		27.50	
Investor Funds	27.00		29.70		29.70		29.70		29.70		29.70	
Invest. Funds at Jan. 1	25.00		25.00		27.50		27.50		27.50		27.50	
New Investment			0.00		0.00		0.00		0.00		0.00	
Existing Investment			25.00		27.50		27.50		27.50		27.50	

Source: Exhibit R-63 and R-4, page 24

Example D. RISING PRICES—HISTORICAL COST VALUES - NOMINAL CAPITAL FUNDS RATE - Assumption: prices increase 10% on Dec. 31/Year 1, then remain at new level

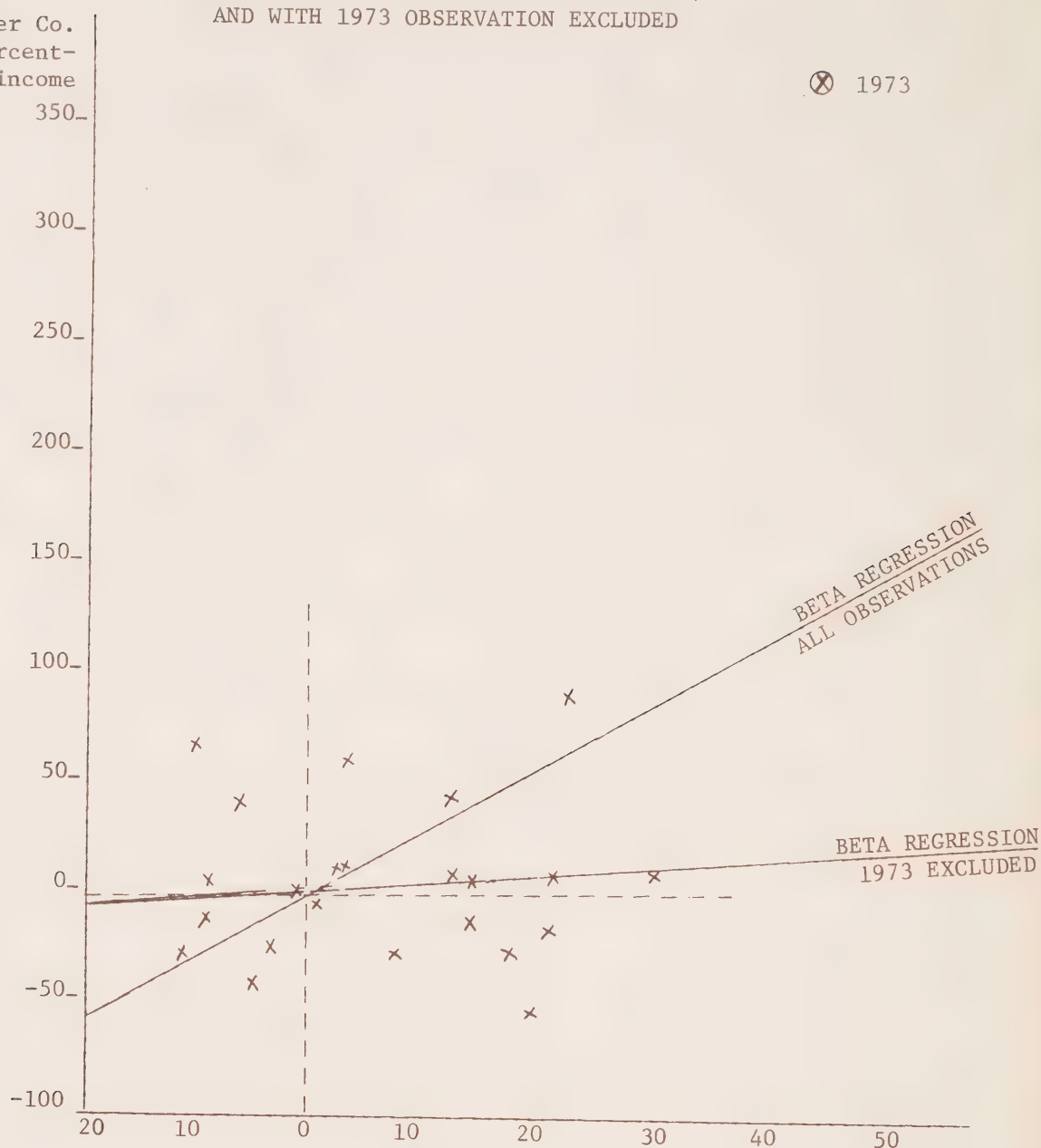
	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6	
	Jan.1 Value	Dec.31 Dep'n	Jan.1 Value	Dec.31 Dep'n	Jan.1 Value	Dec.31 Dep'n	Jan.1 Value	Dec.31 Dep'n	Jan.1 Value	Dec.31 Dep'n	Jan.1 Value	Dec.31 Dep'n
Shovel 1	 10.00	2.50	 7.50	2.50	 5.00	2.50	 2.50	2.50	 11.00	2.75	 8.25	2.75
Shovel 2	 7.50	2.50	 5.00	2.50	 2.50	2.50	 11.00	2.75	 8.25	2.75	 5.50	2.75
Shovel 3	 5.00	2.50	 2.50	2.50	 11.00	2.75	 8.25	2.75	 5.50	2.75	 2.75	2.75
Shovel 4	 2.50	2.50	 11.00	2.75	 8.25	2.75	 5.50	2.75	 2.75	2.75	 11.00	2.75
Valuation Base	25.00		26.00		26.75		27.25		27.50		27.50	
Depreciation Funds Available for Reinvestment	10.00		10.00		10.25		10.50		10.75		11.00	
Shovel Purchases			11.00		11.00		11.00		11.00		11.00	
Depreciation Shortfall			1.00		0.75		0.50		0.25		0.00	
8% Return	2.00		---		2.14		2.18		2.20		---	
18.8% Return	---		4.89		---		---		---		---	
Year-End Values of Invest.	25.00		26.00		26.75		27.25		27.50		27.50	
Investor Funds	27.00		30.89		28.89		29.43		29.70		29.70	
Invest. Funds at Jan. 1	25.00		26.00		26.75		27.25		27.50		27.50	
New Investment			1.00		0.75		0.50		0.25		0.00	
Existing Investment			25.00		26.00		26.75		27.25		27.50	

Source: Exhibit R-62 and R-4 page 23.

"EARNINGS BETA" FOR  
GREAT LAKES PAPER CO. LTD.  
BASED ON ALL OBSERVATIONS (1950-1974)  
AND WITH 1973 OBSERVATION EXCLUDED

Great Lakes Paper Co.  
Ltd. (annual percent-  
age changes in income  
to common after 350-  
taxes

⊗ 1973



ALL OBSERVATIONS

Computed values:

Earnings beta ( $\beta$ )	2.906
Standard error of $\beta$	1.083
"t" value ( $\beta$ /std. error of $\beta$ )	2.684

Source: Exhibits R-23 and R-24

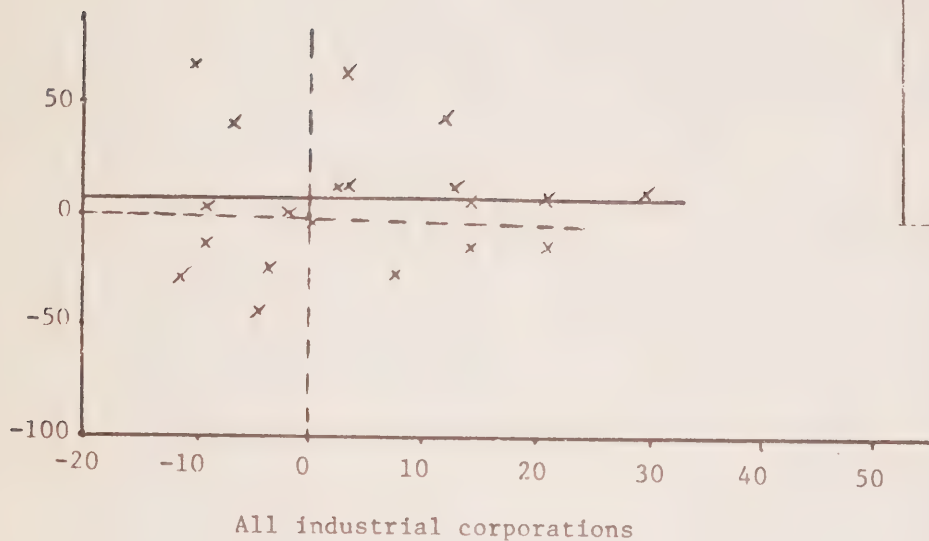
1973 EXCLUDED

Computed values:

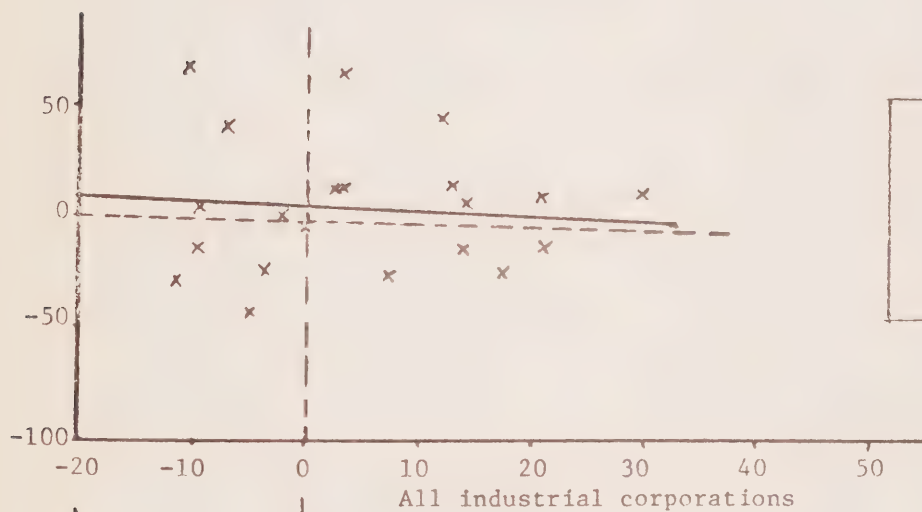
Earnings beta ( $\beta$ )	0.14
Standard error of $\beta$	0.64
"t" value ( $\beta$ /std. error of $\beta$ )	0.22

"EARNINGS BETA" FOR  
GREAT LAKES PAPER CO. LTD.  
BASED ON OBSERVATIONS FOR SELECTED PERIODS

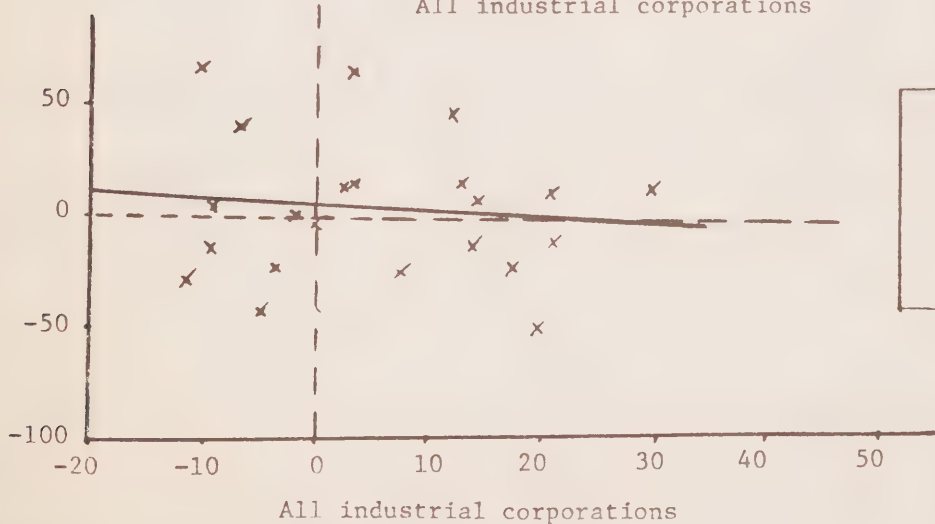
Great  
Lakes  
Paper



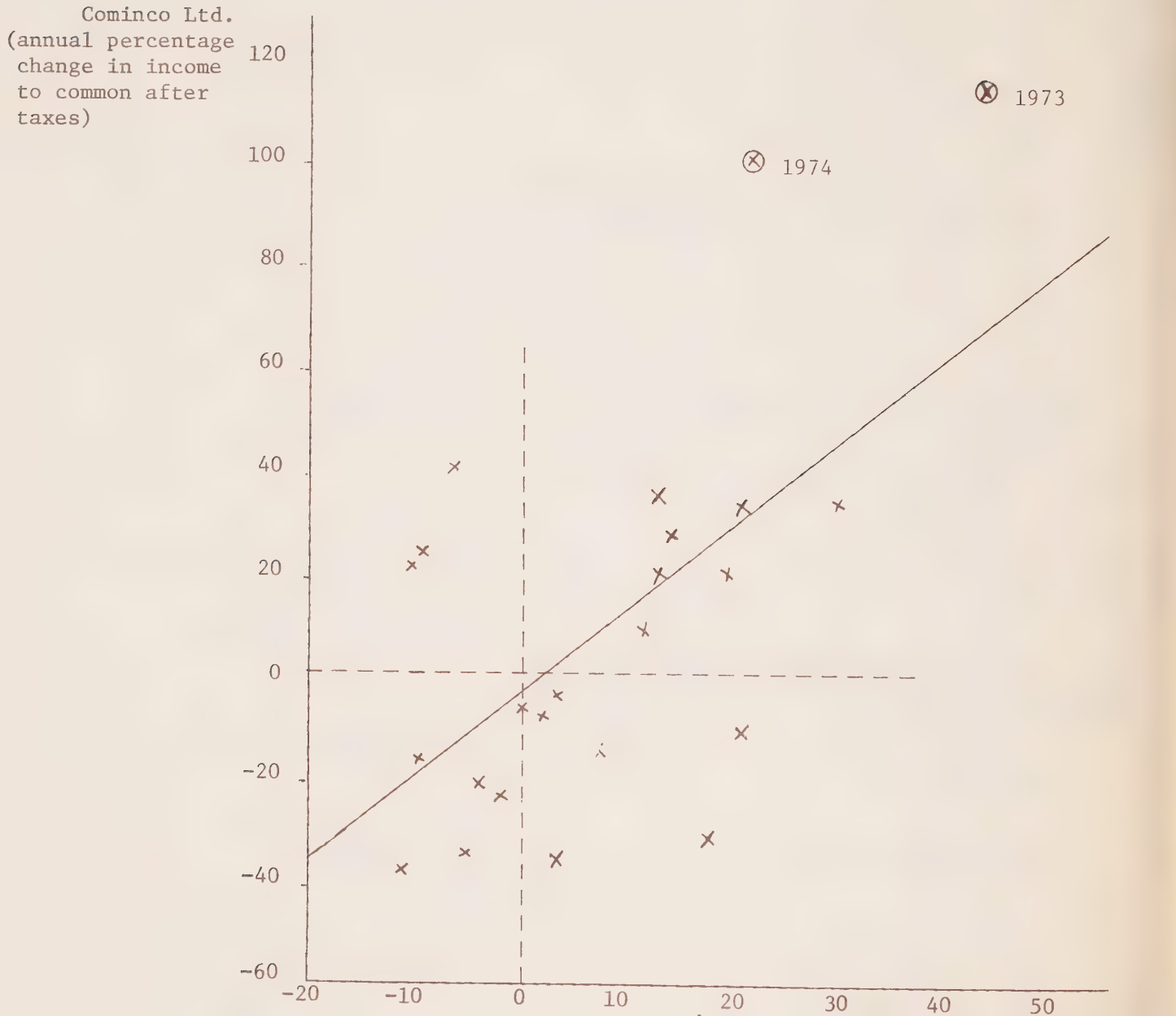
Great  
Lakes  
Paper



Great  
Lakes  
Paper



"EARNINGS BETA" FOR  
COMINCO LTD.  
BASED ON ALL OBSERVATIONS (1950-1974)



Computed values:

Earnings beta ( $\beta$ )	1.682
Standard error of $\beta$	0.476
"t" value ( $\beta$ /std. error of $\beta$ )	3.536



Comparable Risk Companies Alphabetical Listing by Quintiles and Basic Characteristics of Companies		
Company Name	Earnings Beta	Market Beta
<u>Quintile 1</u>		
Alberta Gas Trunk	0.085	0.977
B.C. Sugar Refinery Ltd.	0.087	0.507
B.C. Telephone	0.330	0.409
Bell Canada	0.126	0.235
Calgary Power Ltd.	-0.042	0.875
Canada Packers Ltd.	0.179	0.656
Canadian Utilities	-0.138	0.796
Consumers Gas Co.	-0.041	0.531
Seagram Co. Ltd.	0.111	0.953
Dofasco	1.040	1.144
Dominion Stores Ltd.	1.734	0.413
Greyhound Lines of Canada	-0.161	0.637
Imasco Ltd.	0.331	1.028
Inland Natural Gas Ltd.	0.101	0.250
Labatt, John Ltd.	-0.095	0.813
Molson's	NA	NA
Moore Corp. Ltd.	0.271	1.068
Northern & Central Gas	0.347	0.976
Pitts Engineering Constr.	NA	NA
Selkirk Hold's	0.130	0.624
Silverwood Industries	NA	NA
Simpsons Ltd.	0.117	1.136
Slater Steel Industries	NA	NA
Southam Press Ltd.	0.584	0.704
Thomson Press Ltd.	-0.155	0.965
Trans Canada Pipe Lines	0.178	0.898
Trans Mountain Oil Pipelines	-0.432	0.804
Union Carbide Canada Ltd.	1.588	0.882
Walker-Gooderham & Worts	-0.106	0.680
Woodward Stores Ltd.	-0.018	0.965
Union Gas of Canada Ltd.	-0.460	0.669

Comparable Risk Companies Alphabetical Listing by Quintiles and Basic Characteristics of Companies (continued)		
Company Name	Earnings Beta	Market Beta
<u>Quintile 2</u>		
Alcan Aluminum Ltd.	1.048	0.800
Algoma Central Railway	0.159	0.846
Algoma Steel Corp. Ltd.	0.655	0.876
Alminex Ltd.	2.252	0.998
Campbell Red Lake Mines	2.189	0.724
Canada Cement Lafarge	NA	NA
Canadian Industries Ltd.	1.802	0.837
Canadian Tire Corp. Ltd.	-0.392	1.050
Crain (R.L.) Ltd.	1.108	0.888
Denison Mines Ltd.	0.590	1.164
Dome Mines Ltd.	NA	NA
Dominion Bridge Co.	NA	NA
Domtar Ltd.	2.712	0.966
Gulf Oil Canada	1.288	1.085
Hollinger Mines Ltd.	NA	NA
Hudson's Bay Co.	0.417	1.427
Imperial Oil Ltd.	0.809	1.171
Interprovincial Pipeline	-0.024	1.128
Maple Leaf Mills Ltd.	NA	NA
Phillips Cables Ltd.	0.637	1.171
Shell Canada Ltd.	0.936	1.130
Simpson-Sears Ltd.	0.521	1.224
Standard Broadcasting Co.	-0.264	0.958
Steel Co. of Canada Ltd.	-0.105	1.187
Steinberg's Ltd.	-0.420	0.708
Texaco Canada Ltd.	0.256	1.021
Wajax Ltd.	NA	NA
Weston (George) Ltd.	1.730	0.780
Metropolitan Stores	NA	NA
Canron Ltd.	1.468	1.228
Cominco Ltd.	2.596	1.159
Reitman's (Canada) Ltd.	-0.070	0.918

Comparable Risk Companies Alphabetical Listing by Quintiles and Basic Characteristics of Companies (continued)		
Company Name	Earnings Beta	Market Beta
<u>Quintile 3</u>		
Abitibi Paper Co. Ltd.	5.430	1.224
Asbestos Corp. Ltd.	5.497	1.095
Bethlehem Coper Corp.	NA	NA
Canadian Hydrocarbons	NA	NA
Canadian Cablesystems Ltd.	NA	NA
Dominion Textile Co. Ltd.	NA	NA
Dupont of Canada Ltd.	1.452	1.040
Four Seasons Hotels Ltd.	NA	NA
Fraser Companies Ltd.	-21.224	0.630
Gaz Metropolitaine Inc.	NA	NA
Hudson's Bay Oil & Gas	0.962	1.339
Int'l Nickel Co. of Canada	0.941	1.330
Inter-City Gas Ltd.	0.739	1.171
Intermetco Ltd.	NA	NA
Interprov. Steel & Pipe	-0.464	1.197
Lake Ontario Cement Ltd.	NA	NA
Loeb (M) Ltd.	2.826	1.026
Maclean Hunter Limited	0.206	0.667
Macmillan Bloedel Ltd.	2.748	1.062
Noranda Mines. Ltd.	1.331	1.485
Oshawa Group	0.162	1.172
Pancanadian Petro	1.337	1.165
Peoples Jewelers	1.035	0.785
Pine Point Mines, Ltd.	NA	NA
Reichold Chemicals CDA	3.252	0.985
Scott's Restaurants	NA	NA
Texasgulf Inc.	NA	NA
Transair Ltd.	3.448	0.096
West Coast Transmission	NA	NA
Western Broadcasting Ltd.	-0.176	1.221
Zellers Ltd.	-0.090	1.168

Comparable Risk Companies  
Alphabetical Listing by Quintiles and  
Basic Characteristics of Companies  
(continued)

Company Name	Earnings Beta	Market Beta
<u>Quintile 4</u>		
Acklands Ltd.	6.840	1.079
Brascan Ltd.	-1.807	1.063
Burns Food Ltd.	-6.536	1.097
CAE Industries CI.A	12.385	1.209
Canadian Indus. Gas & Oil	1.173	1.661
Canadian Marconi Co	NA	NA
Carling O'Keefe Limited	NA	NA
Dome Petroleum Ltd.	1.048	2.004
Great Lakes Paper Co.	5.549	1.350
Harding Carpets Ltd.	1.639	1.466
Hayes-Dana Ltd.	NA	NA
Hudson Bay MNG & Smelting	4.671	1.226
Husky Oil Ltd.	-1.893	1.418
Kerr Adison Mines	NA	NA
Murphy Oil Co. Ltd	0.856	1.242
Neonex International Ltd.	NA	NA
Pacific Petroleums Ltd.	-0.327	1.661
Patino NV	16.889	0.362
Placer Development Ltd.	NA	NA
Price Company Ltd.	4.121	1.268
Rio Algom Mines Ltd.	2.868	1.372
Russel, Hugh	2.467	1.527
Scurry-Rainbow Oil Ltd.	1.473	0.650
Toronto Star Ltd.	NA	NA
Union Oil Co. of Canada	NA	NA
Vulcan Industrial Pkg.	-1.897	1.078
Westeel-Rosco Ltd.	-10.633	1.095
Westinghouse Canada Ltd.	2.955	1.452
White Pass & Yukon Corp.	-0.372	0.991
Celanese Canada Ltd.	-7.056	1.203
Hawker Siddeley Canada	NA	NA
Western Decalta Petrolm	2.174	1.741

Comparable Risk Companies  
Alphabetical Listing by Quintiles and  
Basic Characteristics of Companies  
(continued)

Company Name	Earnings Beta	Market Beta
<u>Quintile 5</u>		
Atco Industries Ltd.	NA	NA
B.C. Forest Products	4.988	1.444
Bombardier Ltd.	NA	NA
Bow Valley Ind. Ltd.	4.017	1.855
Canadian Export Gas & Oil	6.159	1.803
Canadian Superior Oil	1.292	11.429
Cara Operations Limited	NA	NA
Cassier Asbestos Corp.	-1.487	1.559
Canadian Occidental Petroleum	2.030	1.859
Commonwealth Holiday Inns. Cda.	NA	NA
Consolidated Bathurst	5.276	1.210
Consolidated Textile Mil.	2.036	1.630
Consumers Distributing	NA	NA
Falconbridge Nickel Mine	10.096	1.567
Foodex	NA	NA
Home Oil	2.100	1.850
I W C Communications	NA	NA
I.T.L. Industries Ltd.	NA	NA
Kaps Transport	NA	NA
Maclean-Hunter Cable TV	NA	NA
Massey-Ferguson Ltd.	NA	NA
McIntyre Porcupine Mines	NA	NA
Numac Oil & Gas Ltd.	NA	NA
Ranger Oil (Canada) Ltd.	NA	NA
Revelstoke Inds.	0.682	1.399
Scott Lasalle Ltd.	NA	NA
Shaw Pipe Industries Ltd.	NA	NA
Sheritt Gordon Mines	3.426	1.687
Skyline Hotels Ltd.	NA	NA
United Canso Oil & Gas Ltd.	NA	NA
Weldwood of Canada Ltd.	NA	NA

Source: Exhibit R-30



Tonnage Betas - Various Commodities						
Commodity	Time Period	Phys. Vol. Beta	"t" Value	Intercept	"t" Value	R <sup>2</sup>
Logs & Bolts of Wood	1957-74	0.561	1.717	-0.790	0.149	0.164
Lead Ore & Concentrates	"	0.364	0.679	4.717	0.543	0.030
Zinc Ore & Concentrates	"	0.214	0.637	6.415	1.177	0.026
Iron & Steel Scrap	"	0.751	2.145	-1.477	-0.260	0.235
Clay	"	0.338	2.099	-0.089	-0.034	0.227
Sand, Industrial	1957-74	0.457	2.328	0.315	0.099	0.265
Lumber & Wood Shakes	"	0.006	0.042	0.886	0.352	0.000
Sulphuric Acid	"	0.053	0.099	18.65	2.150	0.001
Copper & Alloys	"	-0.156	-0.596	3.614	0.852	0.023
Lime (Hydrated & Quick)	"	0.168	0.508	3.153	0.588	0.017
Passenger Automobiles & Chassis	1957-74	0.314	1.000	4.198	0.823	0.062
Other Vehicles, Parts	"	0.400	1.420	2.225	0.486	0.118
Pulpwood Logs & Chips	1956-74	0.284	1.186	1.362	0.356	0.081
Sand & Gravel	"	0.502	1.356	-7.493	-1.266	0.103
Sawmill Products, Veneer & Pulpwood	"	0.205	1.470	2.235	1.002	0.119
Woodpulp	"	0.040	0.277	4.562	1.975	0.005
Newsprint Paper	"	0.052	0.557	1.226	0.823	0.019





Comparison of 1974 After Tax Capital  
Funds Rates on Common Shareholders' Equity  
Estimated by the Railways, Provinces, and the Commission

Method of Estimation	After Tax Rate as Computed By		
	Railways	Provinces	Commission
1. Basic Discount Cash Flow:			
<u>Estimating Long-Term Growth</u>			
1.1 - 10 Year Average Earnings	17.0	10.3-14.1	15.0*
1.2 - 10 Year Weighted Average Earnings	19.0	13.1	----
1.3 - Dividends	17.8	10.7-12.2	17.8
1.4 - Retention Rate/Return	16.1	9.3-13.0	13.0
1.5 - Average Return-New Investment	17.4	12.9	13.5
2. Discount Cash Flow Variant:			
<u>Earnings Price Approximation</u>			
2.1 - Comparable Risk Companies-Unadjusted	----	12.7	----
2.2 - Comparable Risk Companies-Adjusted for M/B	----	13.7	----
2.3 - Comparable Risk Companies within 10% of M/B=1	----	14.0	14.0
2.4 - Comparable Risk Companies within 20% of M/B=1	----	14.6	14.6
2.5 - CP Ltd. 1973/74 Average E/P	----	----	14.4
2.6 - CP Ltd. 1974 E/P	18.5	18.2	18.5
2.7 - CP Ltd. 1974 M/B in E/P Regression	----	----	14.5
2.8 - CP Ltd. 1974 E/P (Earnings Smoothed)	----	12.0	----
2.9 - CP Ltd. 1969-74 Average E/P	----	9.6	----
2.10- CP Ltd. Adjusted for Regulated Divisions, E/P	17.6	----	----
3. <u>Other CP Ltd. Relationships</u>			
3.1 - CP Ltd. Average Premium over Long-Term Government Bonds	----	11.0	----
3.2 - CP Ltd. Premium over CP Bonds	16.0	----	----
4. <u>Earnings Book Approximation</u>			
4.1 - Canadian Regulated Company Sample, 1974	----	----	15.6
4.2 - Comparable Risk Companies, 1973-74	17.4	----	----
4.3 - Comparable Risk Companies with M/B=1 Adjustment	----	14.6	14.6
4.4 - CP Ltd., 1974	----	10.0	----

Comparison of 1974 After Tax Capital  
Funds Rates on Common Shareholders' Equity  
Estimated by the Railways, Provinces, and the Commission

Method of Estimation	After Tax Rate as Computed By		
	Railways	Provinces	Commission
5. <u>Other Regulatory Decisions</u>			
5.1 - U.S. FCC Allowance Applied to CP Bonds	----	----	14.7
5.2 - Canadian 1974 Allowed Rates	17.0-18.0	14.5	14.5
6. <u>Informed Judgement of Investment Dealer</u>	15.0-20.0	----	----
7. <u>Capital Asset Pricing Model</u>	----	11.0	----
8. <u>Comparable Industry</u>			
8.1 - Solvent U.S. Railroads	----	4.1	----
8.2 - U.S. Investor-Owned Electric Utilities	----	10.9	----
8.3 - Six Canadian Utilities, M/B=1.2162 in E/P Regression	----	----	13.4

Source: The Commission on the Costs of Transporting Grain by Rail, Report Volume 1, Appendix G.

\* Appendix G of Volume 1 of the Report incorrectly shows this number as 13.7. The correct number is 15.0. This is the number utilized in our evaluation.

CP Ltd. Dividend, Earnings, Book Value  
Retention & Growth Rate, 1970-1974  
(Note: 1975 Data Shown for information only)

	1970	1971	1972	1973	1974	1975
D = Dividend per Share	\$ 0.65	\$ 0.66	\$ 0.70	\$ 0.77	\$ 0.86	\$ 0.845
Y = Earnings per Share *	0.84	0.96	1.24	1.66	2.54	2.40
B = Average Book Value per Share	17.95	18.27	20.80	23.24	24.26	26.88
b = Retention Rate - (Y-D)/Y	.226	.313	.435	.536	.661	.647
r = Return on Book = Y/B	.047	.053	.060	.071	.105	.094
g = Growth Rate = br	.011	.017	.026	.038	.069	.061

Estimates of Future Growth Based on Past Growth Rates

Based on 1974	6.9%
Based on 1972-74	4.4%
Based on 1970-74	3.2%

\* In 1975, in keeping with changed procedures for compensation paid under the terms of the National Transportation Act, the company changed from a cash basis to an accrual basis. This resulted in a restatement of the results from 1970 to give retroactive effect to this change. The data shown in this line are stated in the former cash basis, as shown in the 1974 Annual Report to Shareholders.

Source: Exhibit AMS-17, page 141; also appeared as Exhibit AMS-7.

Estimated Growth Rate - E.P.S.  
Canadian Pacific Ltd.  
Based on Exponential Smoothing Model  
(Current Weight 0.3)

Year	$Y_t$	$Y_{st}$	$\frac{Y_{st} - Y_{s,t-1}}{Y_{s,t-1}}$	$g$
1964	1.08	1.08 <sup>*</sup>	---	.03 <sup>*</sup>
1965	1.22	1.13	.046	.034
1966	1.42	1.22	.080	.048
1967	1.12	1.19	(.025)	.026
1968	1.01	1.13	(.053)	.003
1969	.91	1.06	(.062)	(.016)
1970	.84	.99	(.066)	(.031)
1971	.96	.98	(.010)	(.024)
1972	1.24	1.06	.082	.008
1973	1.66	1.24	.170	.057
1974	2.48	1.61	.298	.129

$Y$  = earnings per share

$Y_s$  = earnings per share, smoothed

<sup>\*</sup> = arbitrary initial values

Definition

$$Y_{st} = .3Y_t + .7Y_{s,t-1}$$

$$g_t = .3 \frac{Y_{st} - Y_{s,t-1}}{Y_{s,t-1}} + .7 G_{t-1}$$

Source: Exhibit R-51



First and Second Quintile Companies  
in Increasing Order of Risk

Rank	Total Rank Score	Company Name	1974 Earnings Price Ratio	1974 Return on Book Equity	Market Value Book Value
<u>FIRST QUINTILE</u>					
1	19	*Bell Canada	13.2%	11.4%	0.90
2	29	*B.C. Telephone	55.0	8.7	0.80
3	32	*Consumers' Gas Co.	10.0	16.5	1.68
4	71	Walker - Gooderham and Worts	9.0	13.1	1.85
5	78	*Union Gas of Canada Ltd.	10.4	14.7	1.44
6	104	*Calgary Power Ltd.	11.1	10.8	1.20
7	117	Seagram Co. Ltd.	6.6	9.7	0.88
8	121	Greyhound Lines of Canada	10.3	21.8	2.07
9	125	B.C. Sugar Refinery Ltd.	18.3	37.5	2.38
10	135	*Northern and Central Gas	14.0	16.5	1.17
11	138	*Canadian Utilities Ltd.	14.4	14.7	1.04
12	139	Southam Press	6.2	36.7	5.98
13	140	Moore Corp. Ltd.	5.8	21.3	4.41
14	151	Imasco Ltd.	12.2	21.0	1.73
15	151	John Labatt Ltd.	10.3	17.8	1.68
16	170	*Inland Natural Gas Ltd.	15.1	18.3	1.18
17	175	Woodward Stores	7.5	11.1	1.44
18	176	*Alberta Gas Trunkline	7.3	11.9	1.61
19	177	Silverwood Industries	10.1	5.4	0.66
20	191	*Trans Mountain Oil Pipeline	14.8	20.8	1.35
21	198	Canada Packers Ltd.	13.0	10.9	0.99
22	200	Selkirk Holdings	7.9	12.3	1.52
23	201	Thomson Newspaper	5.3	19.2	3.63
24	202	Dofasco	16.2	13.7	1.33
25	202	Pitts Engineering Constr.	13.4	25.7	2.28
26	207	Dominion Stores Ltd.	14.0	16.2	1.12
27	208	Molson's	7.5	12.8	1.60



First and Second Quintile Companies  
in Increasing Order of Risk

Rank	Total Rank Score	Company Name	1974 Earnings Price Ratio	1974 Return on Book Equity	Market Value Book Value
<u>FIRST QUINTILE (continued)</u>					
28	210	Simpson's Ltd.	7.7	10.7	1.57
29	210	Slater Steel Industries	30.6	21.3	0.80
30	210	Union Carbide (Canada) Ltd.	25.6	28.7	1.18
31	213	*Trans Canada Pipeline	12.2	13.3	1.09
<u>SECOND QUINTILE</u>					
32	216	Canadian Industries Ltd.	18.8	21.4	1.19
33	216	Standard Broadcasting Co.	7.6	22.9	3.19
34	225	Canadian Tire Corp. Ltd.	5.2	17.0	3.23
35	228	Weston (George) Ltd.	16.7	19.4	1.18
36	231	Maple Leaf Mills Ltd.	24.4	12.9	0.55
37	236	Algoma Central Railway	10.7	10.2	1.02
38	243	Steinberg's Ltd.	12.7	12.8	1.03
39	251	Wajax Ltd.	23.4	26.0	1.14
40	257	Algoma Steel Corp. Ltd.	18.4	15.9	0.84
41	259	*Interprovincial Pipeline	9.1	20.5	2.40
42	260	Shell Canada Ltd.	9.7	15.4	1.62
43	262	Alcan Aluminum Ltd.	14.9	13.9	0.99
44	262	Hollinger Mines Ltd.	4.7	6.6	1.68
45	263	Crain (R.L.) Ltd.	21.3	26.1	1.47
46	273	Steel Company of Canada Ltd.	15.8	15.5	0.99
47	282	Simpson - Sears Ltd.	4.9	13.3	2.75
48	283	Domes Mines Ltd.	7.1	28.8	3.82
49	285	Gulf Oil of Canada	12.8	18.8	1.47
50	291	Dominion Bridge Co.	21.0	18.2	0.84
51	292	Denison Mines Ltd.	6.3	17.6	2.92
52	293	Texaco Canada Ltd.	15.1	16.8	1.12
53	300	Hudson's Bay Company	8.9	8.5	0.95

First and Second Quintile Companies  
in Increasing Order of Risk

Rank	Total Rank Score	Company Name	1974 Earnings Price Ratio	1974 Return On Book Equity	Market Value Book Value
<u>SECOND QUINTILE</u> (continued)					
54	306	Phillips Cables Ltd.	15.7	16.8	1.13
55	315	Domtar Ltd.	23.9	28.6	1.20
56	317	Metropolitan Stores	13.9	16.3	1.25
57	321	Imperial Oil Ltd.	7.4	21.1	2.92
58	324	Canada Cement Lafarge	10.5	10.3	1.01
59	326	Canron Ltd.	22.2	22.2	0.94
60	330	Alminex Ltd.	11.3	14.0	1.14
61	337	Cominco Ltd.	18.4	23.7	1.33
62	341	Campbell Red Lakes Mines	4.9	59.6	11.48
63	346	Reitman's (Canada) Ltd.	12.9	24.5	2.95
Average - all companies			13.4	18.2	1.81
- 12 utilities (*)			15.6	14.8	1.32
- all nonutilities			12.9	19.0	1.93

Source: Workpapers of Dr. Quirin and Exhibit AMS-17, pages 142 and 143.

Book Value and Market Value Capital Structures  
of Canadian Utility, U.S. Electric Power and  
U.S. Railroad Corporations, as of December 31, 1974

Company	Capital Structure				
	% Common Stock*	% Preferred Stock	% Minority Interest	% Deferred Taxes	% Debt**
<u>Canadian Utility</u>					
Bell Telephone of Canada-Book	34.6%	6.1%	2.9%	11.2%	45.2%
-Market	30.8	6.5%	3.0	11.9	47.8
British Columbia Telephone-B	22.5	11.9	---	12.9	53.0
-M	19.6	12.3	---	13.0	55.0
Calgary Power, Ltd.-B	24.6	16.1	---	7.8	51.5
-M	23.6	10.3	---	7.9	52.2
Consumers Gas of Toronto-B	26.4	2.5	0.2	3.0	67.9
-M	36.8	2.2	0.2	2.6	58.2
Trans-Canada Pipeline-B	19.8	16.6	---	---	63.6
-M	21.0	16.4	---	---	62.7
<u>U.S. Electric Power</u>					
Cleveland Electric Illuminating-B	29.0	13.2	---	2.3	55.5
-M	30.4	13.0	---	2.2	54.4
Duke Power-B	28.5	12.0	---	2.7	56.8
-M	23.8	12.8	---	2.9	60.5
Duquesne Power & Light-B	31.4	13.8	---	1.2	53.6
-M	29.4	14.2	---	1.2	55.2
Kansas City Power & Light-B	30.5	9.2	---	5.4	54.9
-M	23.5	10.2	---	5.9	60.4
Illinois Power-B	31.8	10.4	---	6.4	51.4
-M	30.2	10.7	---	6.6	52.5

Book Value and Market Value Capital Structures  
of Canadian Utility, U.S. Electric Power and  
U.S. Railroad Corporations, as of December 31, 1974

Company	Capital Structure				
	% Common Stock*	% Preferred Stock	% Minority Interest	% Deferred Taxes	% Debt**
<u>U.S. Railroad</u>					
Burlington Northern, Inc.-B	57.5	0.2	---	7.2	35.1
-M	28.7	0.2	---	12.2	59.0
Norfolk & Western Railway-B	44.0	---	1.8	17.7	36.5
-M	35.4	---	2.1	20.4	42.1
St. Louis & San Francisco Railway					
-B	43.8	---	---	12.0	44.2
-M	21.5	---	---	16.8	61.8
Seaboard Coast Line Railroad-B	47.0	---	---	5.7	47.3
-M	25.2	---	---	8.1	66.7
Southern Pacific Transportation-B	55.6	---	0.3	15.4	28.8
-M	38.3	---	0.4	21.4	40.0
Average - 5 Canadian Utilities-B	25.6	10.6	0.6	6.9	56.2
-M	26.4	10.7	0.6	7.1	55.2
Average - 5 U.S. Electric Power-B	30.2	11.7	---	3.6	54.4
-M	27.5	12.1	---	3.8	56.6
Average - 5 U.S. Railroad-B	49.6	---	0.4	11.6	38.4
-M	29.8	---	0.5	15.7	53.9

\* Market value common equity at year-end is based on shares outstanding times average of year's high and low prices.

\*\* Debt includes long-term debt (including portion due within one year) and short-term debt, that is, back loans or notes payable.

Source: Exhibit AMS-17, pages 109 and 111.

Interest Coverage Ratios, Return on Capital and Return on Common Equity of Canadian Utility, U.S. Electric Power and U.S. Railroad Corporations for the Year Ended December 31, 1974 <u>1</u> /			
	Times Interest Earned	Return on Capital	Return on Common
<u>Canadian Utility</u>			
Bell Telephone of Canada	3.94	11.7%	11.4%
British Columbia Telephone	2.55	10.0	8.7
Calgary Power, Ltd.	2.54	8.7	10.8
Consumers Gas of Toronto	2.36	9.5	15.6
Trans-Canada Pipeline	1.72	8.8	12.1
<u>U.S. Electric Power</u>			
Cleveland Electric Illuminating	2.72	10.0	16.0
Duke Power	2.35	8.9	8.2
Duquesne Power & Light	3.01	8.8	13.2
Kansas City Power & Light	2.80	9.0	9.6
Illinois Power	3.63	9.3	11.7
<u>U.S. Railroad</u>			
Burlington Northern, Inc.	2.74	6.4	5.6
Norfolk & Western Railway	3.70	10.0	11.7
St. Louis-San Francisco Railway	2.39	6.5	7.0



Interest Coverage Ratios, Return on Capital and Return  
on Common Equity of Canadian Utility, U.S. Railroad Power  
and U.S. Railroad Corporations for the Year Ended  
December 31, 1974 1/

Company	Times Interest Earned	Return on Capital	Return on Common
<u>U.S. Railroad</u> (continued)			
Seaboard Coast Line Railroad	2.51	9.0	9.4
Southern Pacific Transportation	4.47	6.8	6.2
Average - 5 Canadian	2.62	9.7	11.7
Average - 5 U.S. Electric	2.90	9.2	11.7
Average - 5 U.S. Railroad	3.16	7.6	8.0

1/ Interest coverage ratios are based on the three years 1972-1974. Return on capital is 1974 earnings before interest and taxes divided by end of year long-term capital. Return on common is 1974 earnings on common divided by end of year common equity.

Source: Exhibit AMS-17, page 110.



Group Depreciation  
Specimen Calculations

Year	Number of Units		Gross Book Value (Original Cost)		Depreciation			Net Book Value (Year end)	Net to Gross Ratio			
	Beginning of Year	Retired	Beginning of Year	Retired	End of Year	Depreciation Accrual	Salvage	Charge for Retirements		Year End Reserve		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		(9)	(10)	(11)
1	1,000	2	998	\$20,000	\$ 40	\$19,960	\$606	\$ 3.6	\$( 40)	\$ 569.6	\$19,390.4	97.15%
2	998	2	996	19,960	40	19,920	604.8	3.6	( 40)	1,138.0	18,782.0	94.29
3	996	2	994	19,920	40	19,880	603.6	3.6	( 40)	1,705.2	18,174.8	91.42
4	994	2	992	19,880	40	19,840	602.4	3.6	( 40)	2,271.2	17,568.8	88.55
5	992	2	990	19,840	40	19,800	601.2	3.6	( 40)	2,836.0	16,964.0	85.68
6	990	2	988	19,800	40	19,760	599.9	3.6	( 40)	3,399.5	16,360.5	82.80
7	988	2	986	19,760	40	19,720	598.7	3.6	( 40)	3,961.8	15,758.2	79.91
8	986	2	984	19,720	40	19,680	597.5	3.6	( 40)	4,522.9	15,157.1	77.02
9	984	2	982	19,680	40	19,640	596.3	3.6	( 40)	5,082.8	14,557.2	74.12
10	982	2	980	19,640	40	19,600	595.1	3.6	( 40)	5,641.5	13,958.5	71.22
11	980	2	978	19,600	40	19,560	593.9	3.6	( 40)	6,199.0	13,361.0	68.31
12	978	2	976	19,560	40	19,520	592.7	3.6	( 40)	6,755.3	12,764.7	65.39
13	976	2	974	19,520	40	19,480	591.5	3.6	( 40)	7,310.4	12,169.6	62.47
14	974	2	972	19,480	40	19,440	590.2	3.6	( 40)	7,864.2	11,575.8	59.55
15	972	2	970	19,440	40	19,400	589.0	3.6	( 40)	8,416.8	10,983.2	56.61
16	970	2	968	19,400	40	19,360	587.8	3.6	( 40)	8,968.2	10,391.8	53.68
17	968	2	966	19,360	40	19,320	586.6	3.6	( 40)	9,518.4	9,801.6	50.73
18	966	2	964	19,320	40	19,280	585.4	3.6	( 40)	10,067.4	9,212.6	47.78
19	964	2	962	19,280	40	19,240	584.2	3.6	( 40)	10,615.2	8,624.8	44.83
20	962	2	960	19,240	40	19,200	583.0	3.6	( 40)	11,161.8	8,038.2	41.87
21	960	2	958	19,200	40	19,160	581.8	3.6	( 40)	11,707.2	7,452.8	38.90
22	958	2	956	19,160	40	19,120	580.5	3.6	( 40)	12,251.3	6,868.7	35.92
23	956	2	954	19,120	40	19,080	579.3	3.6	( 40)	12,794.2	6,285.8	32.94
24	954	2	952	19,080	40	19,040	578.1	3.6	( 40)	13,335.9	5,704.1	29.96
25	952	15	937	19,040	300	18,740	576.9	27.0	( 300)	13,639.8	5,100.2	27.22
26	937	25	912	18,740	500	18,240	567.8	45.0	( 500)	13,752.6	4,487.4	24.60
27	912	75	837	18,240	1,500	16,740	552.7	135.0	( 1,500)	12,940.3	3,799.7	22.70
28	837	85	752	16,740	1,700	15,040	507.2	153.0	( 1,700)	11,900.5	3,139.5	20.87
29	752	132	620	15,040	2,640	12,400	455.7	237.6	( 2,640)	9,953.8	2,446.2	19.73

Year	Number of Units			Gross Book Value (Original Cost)			Depreciation			Net Book Value (Year end) (000)	Net to Gross Ratio	
	Beginning of Year	Retired	End of Year	Beginning of Year	Retired	End of Year	Depreciation Accrual (000)	Salvage (000)	Charge for Retirements (000)			
30	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
31	620	240	380	\$12,400	\$4,800	\$7,600	\$375.7	\$432.0	\$ (4,800)	\$5,961.5	\$1,638.5	21.56%
32	380	132	248	7,600	2,640	4,960	230.3	237.6	(2,640)	3,789.4	1,170.6	23.60
33	248	85	163	4,960	1,700	3,260	150.3	153.0	(1,700)	2,392.7	867.3	26.60
34	163	75	88	3,260	1,500	1,760	98.8	135.0	(1,500)	1,126.5	633.5	35.99
35	88	25	63	1,760	500	1,260	53.3	45.0	( 500)	724.8	535.2	42.48
36	63	15	48	1,260	300	960	38.2	27.0	( 300)	490.5	469.5	48.91
37	48	2	46	960	40	920	29.1	3.6	( 40)	483.2	436.8	47.48
38	46	2	44	920	40	880	27.9	3.6	( 40)	474.7	405.3	46.06
39	44	2	42	880	40	840	26.7	3.6	( 40)	465.0	375.0	44.64
40	42	2	40	840	40	800	25.5	3.6	( 40)	454.1	345.9	43.24
41	40	2	38	800	40	760	24.2	3.6	( 40)	441.9	318.1	41.86
42	38	2	36	760	40	720	23.0	3.6	( 40)	428.5	291.5	40.49
43	36	2	34	720	40	680	21.8	3.6	( 40)	413.9	266.1	39.13
44	34	2	32	680	40	640	20.6	3.6	( 40)	398.1	241.9	37.80
45	32	2	30	640	40	600	19.4	3.6	( 40)	381.1	218.9	36.48
46	30	2	28	600	40	560	18.2	3.6	( 40)	362.9	197.1	35.20
47	28	2	26	560	40	520	17.0	3.6	( 40)	343.5	176.5	33.94
48	26	2	24	520	40	480	15.8	3.6	( 40)	322.9	157.1	32.73
49	24	2	22	480	40	440	14.5	3.6	( 40)	301.0	139.0	31.59
50	22	2	20	440	40	400	13.3	3.6	( 40)	277.9	122.1	30.52
51	20	2	18	400	40	360	12.1	3.6	( 40)	253.6	106.4	29.56
52	18	2	16	360	40	320	10.9	3.6	( 40)	228.1	91.9	28.72
53	16	2	14	320	40	280	9.7	3.6	( 40)	201.4	78.6	28.07
54	14	2	12	280	40	240	8.5	3.6	( 40)	173.5	66.5	27.71
55	12	2	10	240	40	200	7.2	3.6	( 40)	144.3	55.7	27.85
56	10	2	8	200	40	160	6.1	3.6	( 40)	114.0	46.0	28.75
57	8	2	6	160	40	120	4.8	3.6	( 40)	82.4	37.6	31.33
58	6	2	4	120	40	80	3.6	3.6	( 40)	49.6	30.4	38.00
59	4	2	2	80	40	40	2.4	3.6	( 40)	15.6	24.4	61.00
59	2	2	0	40	40	0	1.2	3.6	( 40)	( 19.6)	( 19.6)	-

Source: Exhibit CP-39, pages 8-R-16 and 8-R-17

(3) = (1) - (2)  
 (6) = (4) - (5)  
 (7) = (4) x .0303  
 (8) = (5) x .09

(9) = (5)  
 (10) = (10) prior year end + (7) + (8) - (9)  
 (11) = (6) - (10)  
 (12) = (11) ÷ (6)

GRAIN-SPECIFIC DEPRECIATION AND COST OF CAPITAL  
FOR CNR FREIGHT CARS, 1974

Weighted Average Investment Cost per  
Grain-Carrying Boxcar

Original Investment	\$	2,617
Net Depreciated Investment		912
Depreciation Rate		2.97%
Cost of Capital Rate		5.94%
Annual Depreciation Accrual per Grain Boxcar	\$	77.72
Annual Cost of Capital per Grain Boxcar		54.17
Annual Average Car-Miles per Freight Car on CNR		22,453

Depreciation and Cost of Capital are  
apportioned 80 percent to Car-Days  
at 365 days per year and 20 percent  
to Car-Miles

Depreciation per Car-Day	\$	.17035
Depreciation per Car-Mile		.00069
Cost of Capital per Car-Day		.11873
Cost of Capital per Car-Mile		.00048

The foregoing unit costs apply to grain boxcars which account  
for 87.35 percent of grain carloads, an additional 6.16 per-  
cent being in railway-owned covered hoppers and 6.49 percent  
in Canadian Wheat Board covered hoppers. The railway incurs  
neither depreciation cost nor cost of capital for the latter  
of these.

Depreciation and Cost of Capital  
Unit Costs for Railway-Owned  
Covered Hopper Cars

Depreciation per Car-Day	\$	.62064
Depreciation per Car-Mile		.00378
Cost of Capital per Car-Day		.72607
Cost of Capital per Car-Mile		.00442

Weighting by the percentages of use,  
above, leads to the following weighted  
average unit costs for depreciation  
and cost of capital for CNR grain cars:

Depreciation per Car-Day	\$	.18703
Depreciation per Car-Mile		.00084
Cost of Capital per Car-Day		.14844
Cost of Capital per Car-Mile		.00069

GRAIN-SPECIFIC DEPRECIATION AND COST OF CAPITAL  
FOR CNR FREIGHT CARS, 1974  
(Continued)

Unadjusted Depreciation	
Car-Day Element	\$1,480,327
Car-Mile Element	<u>531,851</u>
Total	\$2,012,178
Unadjusted Cost of Capital	
Car-Day Element	\$1,731,769
Car-Mile Element	<u>626,033</u>
Total	\$2,357,802
Car-Days	3,777,115
Car-Miles	277,005,930
Adjusted Depreciation	
Car-Day Element	\$ 706,434
Car-Mile Element	<u>232,685</u>
Total	\$ 939,119
Adjusted Cost of Capital	
Car-Day Element	\$ 560,675
Car-Mile Element	<u>191,134</u>
Total	\$ 751,809
Overstatement resulting from use of factors for average boxcars instead of those used for grain	
Depreciation	\$1,073,059
Cost of Capital	<u>1,605,994</u>
Total	\$2,679,053

Source: Exhibit AMS-1, attachment N8.2 (revised)

GRAIN-SPECIFIC DEPRECIATION AND COST OF CAPITAL  
FOR CPR BOXCARS

---

Weighted Average Investment Cost  
per Grain-Carrying Boxcar

Original Investment	\$ 5,310
Net Depreciated Investment	1,736

Depreciation Rate 3.03%

Cost of Capital Rate 6.82%

Allowance for Income Tax on  
Cost of Capital 3.65%

Annual Depreciation Accrual per  
Grain Boxcar \$ 160.89

Annual Cost of Capital per  
Grain Boxcar 118.40

Annual Allowance for Income Tax  
per Grain Boxcar 63.36

Annual Average Car-Miles per  
Boxcar 21,808 <

Depreciation and Cost of Capital are  
apportioned 80 percent to Car-Days  
at 365 days per year and 20 percent  
to Car-Miles

Depreciation per Car-Day	\$ .35264
Depreciation per Car-Mile	.00148
Cost of Capital per Car-Day	.25951
Cost of Capital per Car-Mile	.00109
Income Tax per Car-Day	.13887
Income Tax per Car-Mile	.00058

The foregoing unit costs apply to grain boxcars which account  
for 87.63 percent of grain carloads, an additional 3.83 percent  
being in railway-owned covered hoppers and 8.54 percent in  
Canadian Wheat Board covered hoppers, for which the railway  
incurs neither depreciation cost nor cost of capital.

Depreciation, Cost of Capital and  
Income Tax Unit Costs for Railway-  
Owned Covered Hopper Cars

Depreciation per Car-Day	\$ 1.09584
Depreciation per Car-Mile	.00375
Cost of Capital per Car-Day	1.21571
Cost of Capital per Car-Mile	.00416
Income Tax per Car-Day	.65064
Income Tax per Car-Mile	.00223

GRAIN-SPECIFIC DEPRECIATION AND COST OF CAPITAL  
FOR CPR BOXCARS  
(Continued)

Weighting by the percentages of use,  
above, leads to the following weighted  
average unit costs for depreciation  
and cost of capital for CP grain cars:

Depreciation per Car-Day	\$	.35099
Depreciation per Car-Mile		.00144
Cost of Capital per Car-Day		.27397
Cost of Capital per Car-Mile		.00111
Income Tax per Car-Day		.14661
Income Tax per Car-Mile		.00060

Unadjusted Depreciation

Car-Day Element	\$	1,604,990
Car-Mile Element		<u>447,143</u>
Total	\$	2,052,133

Unadjusted Cost of Capital

Car-Day Element	\$	1,780,596
Car-Mile Element		<u>497,103</u>
Total	\$	2,277,699

Unadjusted Income Tax  
Allowance

Car-Day Element	\$	952,958
Car-Mile Element		<u>266,316</u>
Total	\$	1,219,274

Car-Days 3,689,207

Car-Miles 249,800,742

Adjusted Depreciation

Car-Day Element	\$	1,294,875
Car-Mile Element		<u>359,713</u>
Total	\$	1,654,588

Adjusted Cost of Capital

Car-Day Element	\$	1,010,732
Car-Mile Element		<u>277,279</u>
Total	\$	1,288,011

Adjusted Income Tax  
Allowance

Car-Day Element	\$	540,875
Car-Mile Element		<u>149,880</u>
Total	\$	690,755



GRAIN-SPECIFIC DEPRECIATION AND COST OF CAPITAL  
FOR CPR BOXCARS  

---

(Continued)

Overstatement resulting from use  
of factors for average boxcars  
instead of those used for grain

Depreciation		\$ 533,309
Cost of Capital		<u>989,688</u>
	Subtotal	\$ 1,522,997
Income Tax Allowance		<u>528,519</u>
	Total	\$ 2,051,516

Source: Exhibit AMS-2, attachment P7.7 (revised)





